Barriers to the provision of Physical Education in Victorian state secondary schools: informing a peer-led physical activity and school connectedness intervention

(The GLAMA and BLAST programs)

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As the doctoral thesis supervisor of Kate Jenkinson, B.Ed (Hons), I certify that I consider this thesis “Barriers to the provision of Physical Education in Victorian state secondary schools: informing a peer-led physical activity and school connectedness intervention (The GLAMA and BLAST programs)” to be suitable for examination.

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I certify that except where due acknowledgement has been made, the work is that of the author alone; the work has not been submitted previously, in whole or in part, to qualify for any other academic award; the content of the thesis is the result of work which has been carried out since the official commencement date of the approved research program; any editorial work, paid or unpaid, carried out by a third party is acknowledged; and, ethics procedures and guidelines have been followed.

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PUBLICATIONS AND SUBMISSIONS

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Published Peer-Reviewed Journal Articles (Appendix A)

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- **Jenkinson, K. A**., Naughton. G. & Benson, A. C. (2012). The GLAMA (Girls! Lead! Achieve! Mentor! Activate!) physical activity and peer leadership intervention pilot project: A process evaluation using the RE-AIM framework. *BMC Public Health*. 12 (55), doi:10.1186/1471-2458-12-55

- **Jenkinson, K. A**. & Benson, A. C. (2010). Barriers to providing physical education and physical activity in Victorian state secondary schools. *Australian Journal of Teacher Education,* 35(8), 1-17.

- **Jenkinson, K. A** & Benson, A. C (2009). Physical education, sport and physical activity policies: Teacher knowledge and implementation in their Victorian state secondary school. *European Physical Education Review*, 15(3), 365-388.

Peer-Reviewed Scientific Conference Presentations

Oral Presentations (Appendix B)

- **Jenkinson, K. A**., Naughton. G. & Benson, A. C. The GLAMA (Girls! Lead! Achieve! Mentor! Activate!) and BLAST (Boys! Lead! Activate Succeed Together!) peer leadership and physical activity program: A stealth intervention. *International Congress on Physical Activity and Public Health: Be Active Conference*. Sydney Convention and Exhibition Centre, Sydney, Australia, 31stOctober- 3rd November, 2012. Journal of Science and Medicine in Sport, 15 (6) S130.

- **Jenkinson, K. A.** & Benson, A. C. Barriers to providing physical education in secondary schools: Can we engage students? *ACHPER International Conference: Moving, Learning & Achieving*. Prince Alfred College, Adelaide, Australia, 18-20th April, 2011.

- **Jenkinson, K. A.** & Benson, A. C. State secondary school physical educators' knowledge of the Victorian physical education & sport mandate. *A Step Ahead: The Higher Degrees by Research Student Conference*. RMIT University, Melbourne, Australia, 23rd October, 2009.

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Poster Presentations (Appendix C)

- **Jenkinson, K. A**., & Benson, A. C. Physical education teachers' knowledge, implementation of policy and barriers associated with physical education and physical activity. *The Higher Degrees by Research Student Conference – Vision To Reality.* RMIT University, Melbourne, Australia, 21st October, 2011.
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- **Jenkinson, K. A**., & Benson, A. C. Physical education teachers' knowledge, implementation of policy and barriers associated with physical education and physical activity. *International Society for Behavioural Nutrition and Physical Activity* (June, 2011). Melbourne Convention and Exhibition Centre, Australia, 16th-18thJune, 2011.

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COMMONLY USED ABBREVIATIONS

ACHPER	Australian Council for Health, Physical Education and Recreation
ALT-PE	Academic learning time-physical education
BLAST	Boys! Lead! Activate! Succeed Together! Peer leadership and physical activity program for boys
BMI	Body mass index
CEPI	Compliance evaluation protocol of interactions in physical education
CWPT	Class-wide peer tutoring
DEECD	Victorian Department of Education and Early Childhood Development
GLAMA	Girls! Lead! Achieve! Mentor! Activate peer leadership and physical activity program for girls
HAPE	Health and physical education
PA	Physical activity
PAL	Peer-assisted learning
PASE	Physical activity self-efficacy
PE	Physical education
PMA	Peer-mediated accountability
RE-AIM	Framework for process evaluation to assess reach, efficacy, adoption, implementation and maintenance.
SFO	School and Family Occupation Index
SP	School sport
VCAA	Victorian Curriculum and Assessment Authority
VELS	Victorian Essential Learning Standards
VIT	Victorian Institute of Teaching

DEFINITIONS

Active schools' curriculum	A recommendation from the federal government that all schools should provide access to 120 minutes of physical activity per week.
Cross-age tutoring	Tutoring between older and younger students.
Dyads	A tutor and tutee.
Institutional barriers	Barriers to teaching imposed by the school.
Leadership self-efficacy	A person's judgement about their ability to successfully apply leadership skills in a range of contexts.
National physical activity guidelines	National guidelines recommending levels of activity for children, adolescents and adults.
Physical activity self-efficacy	A person's confidence in their ability to be physical active in a range of contexts.
Peer-assisted learning	Peers' assisting others to learn.
Physical education	The curriculum in schools that teaches and promotes participation in physical activity and active lifestyles.
Primary school	The junior level of schooling in Australia. Approximate ages 5-12 years old.
Reciprocal tutoring	Both participants perform the role of the tutee and tutor.
Same-age tutoring	Tutoring occurs across same-age group of students.
School connectedness	A person's level of connectedness to the school environment as measured by their belonging, participation, commitment and relationships.
Secondary school	The higher level of compulsory school in Australia. Approximate ages 12-17 years old.
Sport	A curriculum program that can provide students with an opportunity to participate in both competitive and non-competitive traditional mainstream sports.
Stealth intervention	An intervention with the intention of impacting on more than one outcome.
Student-related barriers	Barriers to participation imposed by students themselves.
Teacher-related barriers	Barriers to teaching and delivering physical education as perceived by teachers themselves.
Uni-directional tutoring	There is a defined tutor and tutee role.

Victorian physical education & sport mandate/policy	A Victorian state government mandate that requires 100 minutes of physical education and 100 minutes of sport education to be delivered to students in state secondary schools per week.
Victorian state secondary schools	Schools that are government funded and accommodate students aged 12-17 years of age.

Thesis summary

THESIS SUMMARY

Background

Schools have been identified as a key health setting; however, understanding the policy and mandates within this environmental context is imperative before developing and implementing an intervention. Especially given that opportunities for physical education and physical activity in schools are declining. In addition, there is a complex array of barriers that physical education teachers need to address, making sustainable school-based health and physical activity interventions increasingly difficult to implement. Stealth interventions that promote one outcome but are enacted for additional reasons have gained recent popularity, particularly when aligned to public health policy. Their use in schools is somewhat unknown and the transition of students from primary to secondary school, a time of pivotal change in adolescent personal, social and cognitive development, may provide an opportunity for such a stealth intervention. To support adolescents during this transition, programs such as peer support, peer mentoring and peer tutoring have been commonly used in Australian schools for some time. Research has shown mentoring/tutoring or peer-assisted learning (PAL) is effective in a range of different contexts, including those involving physical activity and physical education using both cross-age and same-age tutee and tutor environments.

Purpose

This PhD thesis set out to explore Victorian state secondary school teachers' awareness and knowledge of mandated physical education, school sport and physical activity policies. In addition, the ability of schools to meet these policies and the barriers to provision of physical education, school sport and physical activity were also investigated. An understanding of the current context of policy and barriers to physical educators underpinned the development of a school-based intervention that aimed to determine the effects of a peer leadership and physical activity intervention for Year 7 and Year 10 students. Specifically, the intervention aimed to explore whether this stealth intervention could be successful in increasing leadership

self-efficacy (Year 10) and school connectedness (Year 7) as well as physical activity opportunities and physical activity self-efficacy in a non-physical education context.

Review of Literature

The intention of this literature review was to assess if peer-assisted learning (PAL) would be an appropriate strategy to incorporate in a school-based physical activity intervention. Peer-assisted learning is a teaching strategy utilised in both the general classroom and physical education, and often during peer-based school transition programs (which have generally not included physical activity elements). This review aimed to specifically identify school-based PAL physical education and physical activity interventions and assess their capacity to influence student outcomes.

Findings suggested that the implementation of PAL in many different physical activity and physical education contexts led to a diverse range of significant changes such as: skill performance, physical activity and physical education participation, health and nutrition behaviours as well as anthropometric outcomes. Overall, the recommendations from this review were to ensure sustainability of any PAL intervention, and give careful consideration of where the PAL intervention is placed within the curriculum. In addition, it is imperative that the training of the leaders is also evaluated. Given that PAL has successfully been implemented across both physical education programs and in general classroom contexts, the PAL teaching model itself, involving peers assisting peers, is adaptable to many school programs.

Study 1: Physical education and physical activity policies and mandates: Awareness and knowledge

Given the undeniable versatility of peer-assisted learning (PAL) and previous significant findings, it would seem appropriate to integrate PAL within a physical activity intervention. In schools, the logical place for a physical activity intervention is in the physical education program. However, an investigation of the current status of physical education programs was

essential to firstly assess if physical education was indeed a feasible place to implement the proposed intervention.

A preliminary study investigated Victorian state secondary school physical education teachers' knowledge of and ability to implement the mandated policy of 100 minutes of physical education and 100 minutes of school sport per week across compulsory years of schooling. It was found that teachers reported compliance to the mandate within their school of between 23-33% in physical education and 2-3% in school sport across Years 7-10. It was also established that only 48% of those teachers had correct knowledge of the mandate. If schools were having difficulty implementing mandated physical education, it suggests that a physical activity intervention may not be best placed within the school physical education curriculum. Importantly, these findings lead to the investigation of why teachers were having difficulty meeting mandates and the impact this had on schools.

Study 2: Barriers to physical education and physical activity in schools

Therefore, the barriers perceived by teachers to impact on students' participation in school-based physical education and physical activity opportunities were investigated. The barriers to the provision of physical education were found to be largely institutional, although two-thirds of respondents recognised their own difficulties engaging students when teaching as potential obstacles to student participation. Students were also perceived to be influenced by their own (45%) and their peers (62%) low levels of interest when choosing to participate.

The earlier findings indicating that schools could not meet mandated time requirements, and the additional clarification of the institutional, teacher and student-related barriers that impact on both participation and provision of opportunities provided insight into the components integral to the development of a physical activity intervention. Ultimately, if schools cannot provide quality physical education opportunities, it is important to consider where else within a school context might be appropriate to integrate a physical activity intervention.

Study 3: The GLAMA intervention pilot study

The earlier findings in this thesis identified that consideration needed to be given to where to best integrate an intervention into the school curriculum as well as the barriers identified that impact on students' physical activity participation in schools; difficulty engaging students, peer pressure and low interest levels. Furthermore, the previously reported declines in adolescent female participation in physical activity led to the development of the GLAMA (Girls! Lead! Achieve! Mentor! Activate!) pilot intervention. This pilot study attempted to address the aforementioned barriers by engaging students using PAL and providing opportunities for leadership development, physical activity and social interactions for participants. This pilot study specifically investigated the effectiveness of the training protocol for Year 10 female leaders and the integrity and acceptability of activities undertaken by Year 7 female participants.

It was found that despite barriers experienced by students and teachers at an individual level, the factors having the greatest impact on intervention success were those imposed from within the school setting; the structure of the curriculum, timetabling, pressure to meet curriculum and assessment content, lack of support for new initiatives, multiple programs already running within the school, time allowances for teachers, appropriate training for teachers, and support for students to participate. The findings from the pilot study confirmed that a school's ability to adopt, implement and maintain programs needs to be considered and addressed when planning to implement a school-based physical activity intervention across entire year levels. Therefore, finding the appropriate place within curriculum time was an important element to maximise the future success of this peer-leadership and physical activity program. The peer leaders and the teachers favourably received the leadership training, with only minor amendments recommended. In the future, activities need to be carefully sequenced, provide competitive elements and involve clearly defined scoring and time periods.

Study 4: The GLAMA & BLAST Intervention

With the previous findings from this thesis identifying the many institutional based barriers that must be overcome before an intervention is integrated within the school environment it was imperative that the original pilot program was modified in consultation with the school staff, which led to the development of the GLAMA and BLAST (Boys! Lead! Activate! Succeed Together!) programs. This stealth intervention was delivered outside physical education classes by modifying the Year 7 transition program, which already involved PAL learning components, to include physical activity opportunities for students. The primary outcomes were school connectedness (Year 7) and leadership self-efficacy (Year 10).

The implementation of the GLAMA and BLAST intervention over 8-weeks did not result in any significant group-by-time intervention effects, however Year 7 student's school connectedness in both schools significantly declined ($p<0.001$), indicating that quality relationships, participation in and commitment to the school community are important elements for schools to address as they attempt to facilitate this transition period from primary to secondary school. The significant increases in self-reported physical activity self-efficacy over time for Year 10 students ($p<0.001$) and a trend toward significance for Year 7 students ($p=0.054$) warrants further investigation as it refutes previous research that suggests physical activity self-efficacy declines during adolescence. This stealth intervention of the GLAMA and BLAST program was well received by the Year 7 and Year 10 students as well as teachers at the school.

Overall Conclusions

This PhD thesis outlines physical education teachers' awareness and knowledge of Victorian and national physical education and physical activity policies. Evidence suggests awareness was greater than knowledge of these policies. The barriers associated with providing quality physical education and physical activity programs in schools were classified as institutional, teacher or student-related, with the majority identified as institutional. These barriers make it difficult to provide physical education programs and also impact on the physical activity

opportunities within schools. As a stealth intervention, the GLAMA and BLAST peer leadership and physical activity program has provided an insight into school connectedness and leadership self-efficacy during a period of school transition. In addition, it has facilitated a peer-assisted learning (PAL) environment with positive outcomes for both leaders and participants. Future research should investigate transition programs over a longer duration, with greater capacity for interaction between peer leaders and tutees to further promote physical activity self-efficacy opportunities as well as school connectedness and leadership self-efficacy.

CHAPTER 1

Introduction

CHAPTER ONE: Introduction

1.1 Physical Education in Australia

In the past two decades, physical education in Australia and globally has faced ongoing challenges to maintain its' viability in the school curriculum. Physical education across the world "is suffering from decreasing curriculum time allocation, budgetary controls with inadequate financial, material and personnel resources, low subject status and esteem, and is being ever more marginalised and undervalued by authorities" (p.223)[1]. Understanding the foundations of physical education provides an insight into the persistent and complex nature of the many influences contributing to the development of physical education in Australia today.

The initial shaping of physical education in Australia stemmed from a range of practices associated with the military, changing cultural dynamics and the need for economic development [2]. Over the nineteenth and twentieth century's, physical education evolved from military type drills and gymnastics which were both associated with discipline and developing a strong, structured and obedient society [2]. In contrast to the stringent guidelines and routines previously implemented as part of military style physical education in schools, it was suggested that by broadening the physical education programs post second world war, students and teachers of physical education were now just playing games [3]. During the late 1980's and early 1990's as Australia declared it must become a 'clever country', a strengthening academic focus in schools further raised the question of the viability of physical education. It was not only those outside physical education who raised doubts, those within the profession also began searching for their role and identity within schools as the physical education profession appeared to be "…concerned with following trends, with showing that we can fit whatever role society requires of us"(p.2) [3].

The complexities that arise in delivering a quality physical education program in Australia were alluded to as early as the 1992 Senate Inquiry into Physical and Sport Education [4]. The Inquiry was the catalyst for placing physical education back into the educational spotlight and

brought to attention the problems that were festering within the curriculum area. The crowded curriculum in schools, the lack of consistent physical education policy in Australia, the inability to develop agreed outcomes compared to other subject areas and the confusion in defining when and how to provide physical education, health education and school sport were just some of the issues identified [4]. Amongst others, the recommendations from the Senate Inquiry included a minimum weekly time allocation for physical education and the development of consistent physical education and school sport policies.

The Senate Inquiry defined physical education as; ".....an all-encompassing term, including fitness, skill, movement, dance, recreation, health, games and sport plus the appropriate values and knowledge of each"(p.3) [4]. Despite recognising the multifaceted value offered by physical education, as well as the knowledge and values inherent in these, ensuring physical education is a priority within the curriculum has been an ongoing struggle. The development of appropriate, accountable policies and programs will be a key determinant of physical education remaining an integral component of any school curriculum [1].

Shortly after the Senate Inquiry, a national statement and curriculum profile for 'Health and Physical Education for Australian schools' was developed [5, 6], with the focus not just on physical education but also the health curriculum. Since then, that profile has been an essential common reference point for subsequent curriculum development across Australia; often used alongside the 2008 'Melbourne Declaration on Educational Goals for Young Australians' [7, 8]. Importantly, the contemporary context and policies that present themselves to current day health and physical educationalists are vastly different to those between 1992 and 1994 [9].

1.2 The role of physical education in Australia: Public health or physical education?

Since 1992, the role of physical education has changed quite considerably. The broad learning area of 'health and physical education' can still be regarded as crowded [4] however, now

there is an openly contested policy space with much interest in and for the subject [10]. This has led to the focus of 'what else' can be achieved within the health and physical education curriculum. Health and physical education has always been associated with a range of discourses regarding children and adolescent health: inactivity, overweight, and obesity. In an attempt to consider the various roles of health and physical education, the following concerns were raised by Swabbey and Penney (2011):

> *"The question arises, therefore, as to whether health and physical educationalists should seek to appropriate those discourses as a means of achieving an enhanced policy position in the education arenas….before pursing what may be perceived as an opportunity for the learning area to profit from engaging with crisis discourses…and consider curricular and pedagogical discourse may be marginalised as a consequence" (pg.83-84).*

Ultimately, the health and physical education learning area cannot be charged with the responsibility to overcome all of society's ills [11]. Public and societal health issues are complex and require more than just increases in physical activity in physical education classes to achieve changes in those at the greatest risk [12].

The association between physical education and public health was first highlighted by Sallis and McKenzie in 1991. Prior to that there had been limited recognition of physical educations' capacity to increase physical activity and overall health [13]. Currently, evidence suggests there is increasing support for physical education outside the profession by public health national bodies and the success of evidence-based physical education programs are well reported [13]. In addition, there are groups representing physical educators that are public health proponents recommending that federal, state and local policy makers must develop, implement and evaluate physical education policies that ensure children have active physical education opportunities that achieve both health and education goals [13]. Despite any current state or national policy, the underlying concern is that despite the role health and physical

education is perceived to play by the many stakeholders, the implementation of school sport and physical education is usually left to the discretion of individual schools and teachers [14].

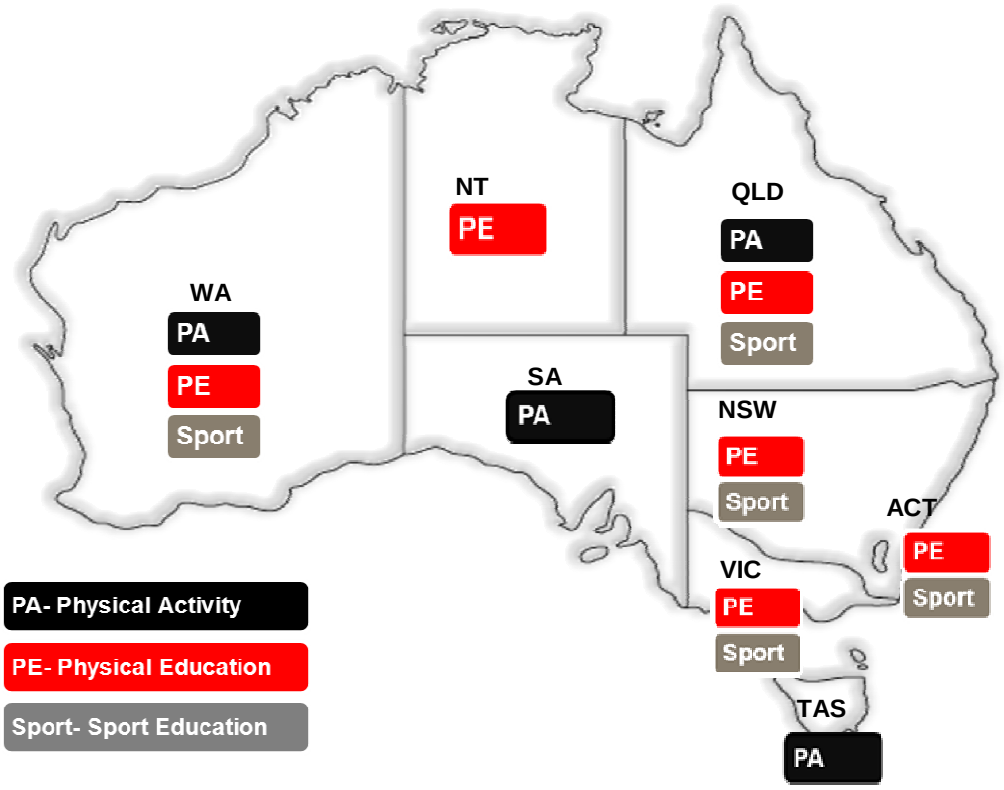
1.3 Current influences on secondary physical education 2012: Mandates and policies in Australia prior to the national curriculum

Before an overview of Australian mandates and policies, it is essential to differentiate between the curriculum content provided in school programs in the health and physical education learning area. As Australia progresses toward a national curriculum for physical education (in draft form at time of this thesis), it is essential to recognise that the responsibility for the development and implementation of curriculum across Australia has always lain clearly with state and territory (hereafter referred to as states) education systems and often individual schools [7]. Consequently there have been many similarities and also differences between states. “Achieving consensus on curriculum matters in relation to health and physical education has historically not been easy, and inevitably, is only ever partially achieved” (pg.9)[7].

These differences are firstly evident with the various names that describe the learning area; ‘health and physical education’ (Victoria); ‘personal development, health and physical education’ (New South Wales) and ‘health and wellbeing’ (Tasmania) and there is evidence across states of subject-based division of curriculum, as well as more integrated curriculum and pedagogy [7]. Experiences across the states indicate it is evident throughout Australia that a large range of content and scope is afforded to states, schools and teachers themselves in defining what is taught to students. For the purpose of this study, each state was assessed relevant to their provision of one or a combination of: physical education, school sport and physical activity. Time and curriculum allocation to classroom-based ‘health, personal development, wellbeing’ or other similar content areas were not investigated: active, practical classes were key outcomes required to be included in this study.

Although physical education and school sport have outcomes of increasing physical activity and are provided within the school environment, they do not share the same goal or serve the same individual needs. Physical education is often concerned with developing student physical competence and confidence, and can develop the ability of students to perform in a range of physical activities [15]. In contrast, school sport provides opportunities for both competitive and non-competitive sport during co-curriculum time. This is not to be confused with the sport education pedagogical model, often implemented within physical education classes with the intent of helping students become competent, literate and enthusiastic sports persons [16] and can often be found being conducted with physical education classes. Although physical activity is a recent addition to school curriculum policies there are few guidelines available to define the intention, implementation requirements and why it should take precedence over physical education and school sport.

At the completion of this thesis, Australia was still without a national policy or physical education curriculum. Until such time that the national curriculum is enacted, states will continue to have their own requirements stipulated by their governing Education Department. These requirements are presented in Figure 1.1. Victoria is the only state that has specifically defines the time allocations and type of activity which students should be undertaking [17]. The Victorian Physical Education and Sport policy (1999) mandates the requirement of 100 minutes per week of physical education and 100 minutes per week of school sport across compulsory levels of secondary school (Year 7-10). The Australian Capital Territory (ACT) is the only other state to provide a detailed physical education and sport curriculum requirement of 150 minutes per week within secondary schools, although the time assigned to each is not specified [18]. The remaining states all have time allocations that encourage the provision of 120 minutes per week within schools of one, or a combination of the following: physical education, physical activity, and/or sport (Western Australia and Queensland) [19, 20], physical education or sport (New South Wales) [21], and physical activity (South Australia, Tasmania) [22, 23] (Figure 1.1).



Note: ACT: 150 minutes per week; NSW: 120 minutes per week; NT: 120 minutes per week; QLD: 120 minutes per week; SA: 120 minutes per week; TAS: 120 minutes per week; VIC: 200 minutes per week; WA: 120 minutes per week.

FIGURE 1.1: Australian government secondary school curriculum content and time allocation

Despite such state policies, over a long period of time, studies have reported that students in Australia are not meeting physical education mandates or recommendations. After the Daily Physical Education Program (DPEP) was implemented in some states of Australia during the late 1970's and 1980's, it was found that no schools or teachers, irrespective of how enthusiastic or competent they were, had been able to fulfil the daily recommended time requirements of the program [24].

Furthermore, generous estimates concluded that less than 10% of Australian school children in state schools undertook daily physical education as part of the Daily Physical Education Program [25]. In 1999, the South Australian '100 Minute Report' highlighted that although there was an Education Department policy for students to participate in 100 minutes of physical education and sport each week during their compulsory years of schooling, over half

of secondary (67%) and primary schools (55%) were unable to satisfy this requirement [26]. Similarly, a Queensland review (2007) found that just under half of secondary students (41%) were not accessing adequate amounts of physical education or sport each week in schools [27].

There is limited research on physical education provision and implementation in Australia, with no published data for Victoria available at the commencement of this PhD study. The ongoing concern is that despite many policies to guide states in their curriculum development, many schools remain unable to meet recommendations or mandates. This emphasises the challenge of not only disseminating policy but also the lack of accountability of schools, and consequently the impact of schools' and teachers' inability to implement the required curriculum content within appropriate time allocations. It is essential to understand the barriers associated with the implementation of physical education and sport. An improved understanding may facilitate opportunities to overcome the barriers and provide enhanced, quality physical education and physical activity experiences in the curriculum for students in schools. Knowledge and consideration of these barriers is also essential to guide the design of the intervention aspect of this research.

1.4 Barriers to physical education and physical activity in schools

Barriers within schools that restrict teachers' capacity to provide physical education programs to their students have been previously classified as being either *institutional* (outside the teachers' control) or *teacher-related* (arising from the teachers' behaviour) [28]. Studies have highlighted many *institutional* barriers including: budget constraints, scarce resources, reductions in time provisions in the curriculum, the absence of professional development, the crowded curriculum and the lack of facilities and equipment [4, 28-30]. Most *teacher-related* barriers have been reported in studies conducted within primary schools [28, 31, 32]. The barriers include: possessing low levels of confidence or interest in teaching physical education, being unable to provide safely planned and structured lessons, having had personal negative

experiences in physical education and a lack of training, knowledge, expertise and qualifications to teach physical education [33-35].

Focusing on the barriers experienced in secondary school environments, a recent study from the United Kingdom reported *institutional* and *teacher-related* barriers similar to the aforementioned studies [36]. However, in addition it found that teachers perceived that secondary school-aged students were lured by the greater availability of sedentary opportunities and consequently suggested that lower levels of fitness and physical ability of students might be impacting on both delivery and participation in physical education and physical activity [36]. Therefore, further consideration of other barriers in secondary schools that inhibit the delivery of and students' participation in physical education is warranted. *Student-related* barriers, those arising from student choices and behaviours in and toward physical education and physical activity, must also be taken into consideration when providing physical activity and physical education opportunities for students.

The unique context of physical education and physical activity in schools must be understood prior to placing a proposed intervention in any school environment. An understanding of the barriers is essential to ensure that the intervention can consider and address institutional, teacher and student constraints thus potentially becoming more sustainable. Importantly any intervention must consider the curriculum and content already in place within a school. Curriculum friendly interventions should not be designed to replace but to add value to programs currently offered, as many successful school-based physical education and physical activity interventions have previously done [37].

1.5 School-based physical education and physical activity interventions

Reviews of school-based physical activity programs have reported increasing evidence that physical activity interventions are being successfully implemented in schools [37, 38]. Indeed schools may be best placed to provide the most holistic and developmentally appropriate

experiences in health and physical activity. Despite having the potential to deliver a range of outcomes, a large number of educational outcomes and directives must be prioritised and met within the school curriculum. Difficulties with implementing interventions in different school contexts have previously included: limited teacher participation, low program readiness, absence of program advocates, inadequate funding, reduction in infrastructure, limited teacher training and support, insufficient quantity of program materials, and inconsistent staffing [39-41]. These barriers suggest that effective interventions require the combination of careful planning and the engagement and support of the whole school community.

The primary aim of many school physical activity interventions is to improve physical activity self-efficacy. Self-efficacy is reported as the most commonly assessed mediator in youth interventions and there is strong support for such physical activity interventions to target self-efficacy using appropriate strategies [42]. As self-efficacy pertains to one's belief in their ability to perform in a range of environments [43], physical activity self-efficacy therefore reflects one's belief in their ability to perform in physical activity and physical education contexts. Previous research has reported physical activity and sport competency beliefs decline during adolescence, in particular for girls who are generally less active than boys in secondary schools [44-46]. A recent review reported higher scores of perceived self-efficacy measures were also associated with smaller declines in physical activity [47].

In addition to the complexities faced when introducing interventions in schools, as previously discussed there are also difficulties with maintaining the delivery of existing physical education programs within schools. Teachers are aware of their own difficulties of facilitating effective and engaging physical activity and physical education classes for students [48]. In overcoming these difficulties, teachers often adopt a range of teaching strategies, styles and methods to engage students in class. One such method that teachers in broader curriculum areas have successfully used is peer-assisted learning.

1.6 Peer-assisted learning in physical education, sport and physical activity

In view of adolescents' preferences to interact with and therefore be influenced by peers, and the accessibility to each other within the school environment, the case for peers assisting peers in many roles including education is both feasible and compelling [49]. A myriad of terms are used to describe 'peer interactions'. Despite varied terminology, the common foundations involve that via the interaction with peers, learning occurs across all developmental domains.

Peer-assisted learning (PAL) is one generic label used to describe teaching strategies and models that facilitate peer education practice [50]. It is an instructional strategy and has demonstrated great transferability across a range of educational contexts [51]. Commonly used variants of PAL in physical education and school physical activity programs include: peer tutoring, peer teaching and class-wide peer tutoring [50, 52-54]. Many studies have included peer tutoring and PAL in the general classroom, literacy and numeracy remedial interventions and the benefits of peer teaching for students with disabilities are well documented [50, 55-58]. The variations in PAL programs include not only many different names but a range of variables that can also be manipulated [59]. In doing so, different outcomes can be achieved: same-age or cross-age tutoring, same gender or mixed gender tutoring, reciprocal or unidirectional, settings (classroom or outside the classroom), intensity (one session per week or five sessions per week of various durations), time of day (inside or after/outside school), targeted domain (social, cognitive, physical), and scope (supporting current curriculum or changing the curriculum) [59].

There is value for both the tutor and tutee in a PAL environment. Many peer-assisted adolescent interventions have encouraged a range of leadership skills that are applicable in many contexts including improving inter and intra-personal skills and increasing knowledge of both physical activity and health outcomes [50, 59]. In addition, the reported benefits associated with leadership programs have seen improvements in leadership self-efficacy, self-esteem, general self-efficacy, volunteering rates, cooperation, goal setting, social skills, self-

determination, reorganisation, clarification, and knowledge-building skills [49, 60-64]. Although not widely researched in adolescents, leadership self-efficacy is a person's judgement about their ability to successfully apply leadership skills when setting a task for a group, and building relationships with intent to gain participant commitment to achieve goals and confront obstacles [65].

It is evident from previous research that PAL may be an appropriate strategy by which to encourage participation in programs and develop leadership skills. However, providing opportunities outside traditional physical education classes may also result in an additional approach to engage students and further promote physical activity. Given that schools and teachers are unable to meet mandated time requirements and many barriers to the provision of physical education have been reported, a *stealth* intervention may be appropriate to enhance participation in physical activity, leadership self-efficacy and promote student engagement via the use of peer-assisted learning.

1.7 A stealth approach: Using peer-assisted learning during the primary to secondary school transition period to promote physical activity

Within school settings, the effectiveness of stealth interventions that promote one outcome whilst designed to illicit additional outcomes certainly warrants further investigation as there is currently no published data available. Stealth interventions are widely used in public health contexts, particularly pertaining to public health policy and obesity interventions [66, 67]. For example public health campaigns for increasing physical activity and sound nutrition practices may also be protective against debilitating chronic diseases such as obesity, cardiovascular diseases and osteoporosis. As schools in Australia are searching for purposeful programs to assist the transition of students from primary to secondary school; this time of pivotal change in adolescent personal, social and cognitive development may just provide an opportunity to enlist such an approach.

Despite the myriad of changes that take place during this transition from primary to secondary school, many students pass through this time without undue stress and experience positive outcomes [68, 69]. In contrast, it is not surprising that this transition is sometimes underpinned by negative experiences [70, 71]. To support adolescents during this period, programs such as peer support, peer mentoring and peer tutoring have been used in Australia and throughout the world for some time [49].

The aim of many school transition programs is to promote a sense of school connectedness. School connectedness indicators have included students liking school, having a sense of belonging, positive relationships or bonds with those in school and participation in extra curricula activities [49, 72]. With previous research reporting that the transition period is susceptible to declines in sport competency beliefs and physical activity participation [70, 73, 74], a stealth approach incorporating physical activity within the school transition program may potentially impact upon not only cognitive and social outcomes, but also physical activity outcomes. By limiting the impact on existing physical education programs which already have tremendous constraints on time, resources and participation, presenting a physical activity intervention in a PAL environment outside curriculum time may facilitate an opportunity to address the many needs of the students' transition to secondary school.

1.8 Aims

The following chapters of this dissertation will review the literature specifically in relation to the effectiveness of PAL environments in schools. This is then followed by a series of investigations that will detail the physical education environment within schools and the versatility of the school context to implement a physical activity intervention.

The primary aim of the research presented in this thesis was to implement a peer leadership, school connectedness and physical activity intervention for Year 7 and Year 10 students. In doing so, changes to school connectedness were the primary outcome. However the stealth

component of physical activity self-efficacy was developed via the selection of appropriate activity challenges. The secondary aim was to use the knowledge of the current context of policy integration and barriers to physical education teachers in state secondary schools, to guide the appropriate planning and delivery of the physical activity intervention. And finally, the aim was to use a stealth approach to implement an intervention that minimised the impact on the existing physical education program. The intent was to use an alternative underdeveloped opportunity, which was the existing peer mentoring program, and modify it to become the GLAMA and BLAST program that would provide additional opportunities for students to be active within the school day.

The following hypotheses were investigated over the course of this thesis:

i. That Victorian State secondary schools are not meeting state mandates for physical education or sport.
ii. That physical education teacher's would perceive institutional barriers to be the primary influence on physical education and physical activity participation by their students in Victorian state secondary schools.
iii. The pilot of the physical activity intervention will be influenced more by institutional barriers than student-related or teacher-related barriers.

At the conclusion of the intervention:

iv. Year 10 peer leaders will experience a greater increase in leadership self-efficacy than Year 10 students from the control school.
v. Physical activity self-efficacy of both the Year 10 peer leaders and Year 10 control group will not change.
vi. Year 7 participants in the intervention school will maintain their level of school connectedness in comparison to a decline in the control school.
vii. Year 7 participants in the intervention school will improve physical activity-self efficacy in contrast to a decline in the control school.

CHAPTER 2

Peer-assisted learning in school physical education, sport and physical activity programs: A systematic review

CHAPTER TWO: Peer-assisted learning in school physical education, sport and physical activity programs: A systematic review

2.1 Preface

A systematic review was undertaken to accurately assess the gaps in the literature and investigate the transferability of peer-assisted learning (PAL) to a school-based physical activity intervention. Outcomes from school-based PAL programs in a range of different curricula and non-curricula contexts have been well documented; in the general classroom, literacy and numeracy remedial interventions as well as a broader applications involving peer teaching for students with disabilities [55-58]. However, the purpose of this systematic review was to rigorously evaluate the effectiveness of school-based interventions that specifically included elements of PAL in school physical education, sport, and/or school physical activity programs. The relevant findings of this literature review were in turn used to guide the development of the physical activity intervention in this thesis. This chapter is based a peer-reviewed paper accepted for publication in *Physical Education and Sport Pedagogy* (Appendix A).

2.2 Introduction

The development of exercise, physical activity and healthy lifestyle behaviours among children and adolescents can translate into reduced health risks later in life [75]. Hence, providing quality education throughout early critical and impressionable stages is a vital component in combating potential health risks. Schools have been identified as crucial health settings and should be encouraged to further develop physical education and physical activity programs that are appropriate and motivating for students [76, 77]. However, physical education in schools should not be seen as the cure of all society's ills [11] and public and societal health issues are complex and require more than just increases in physical activity in physical education classes to achieve changes in those at the greatest risk [12].

A review of school-based physical activity programs has found a growing body of evidence of physical activity interventions being implemented in schools [38]. Indeed schools may be best placed to provide the most holistic and developmentally appropriate experiences in health and physical activity. A multitude of factors including the amount of time students spend within schools, and the elements of the school curriculum such as physical education that have the potential to be modified and adapted to meet a range of outcomes, ensure schools are well positioned to provide access to these experiences.

Despite having an environment potentially rich enough to impart this knowledge, schools have a large number of educational outcomes and directives to meet. Within the physical education curriculum, providing knowledge of strategies to alleviate potential health risks is a small component of an overall objective; opportunities for development across the psychomotor, affective and cognitive domains should also be provided [78]. To achieve these many outcomes, physical educators are required to implement different teaching styles, strategies and programs to assist student learning and development.

In view of adolescents' preferences to interact with and therefore be influenced by peers, and the accessibility to each other within the school environment, the case for peers assisting peers in many roles including education is both feasible and compelling [49]. A myriad of terms are used to describe 'peer interactions'. Many terms are creative blends and have selective elements from peer-based instructional models and programs representing a diverse range of goals and assumptions [53]. Despite varied terminology, the common underpinning value is that through the interaction with peers, learning occurs across various domains.

Peer-assisted learning (PAL) is one generic label used to describe teaching strategies and models that facilitate peer education practice [50] and will be used throughout this review to represent the collective 'peer-assisted learning' process. Peer-assisted learning is an instructional strategy and has been shown to have great transferability across a range of educational contexts [51]. Commonly used teaching models that incorporate various

components of peer-based interaction and learning in physical education and school physical activity programs include, peer tutoring, peer teaching and class-wide peer tutoring [50, 52-54]. Many studies have included peer tutoring and PAL in the area of general classroom education as well as for remedial interventions. Moreover, the benefits of peer teaching for students with disabilities are well documented [55-58]. The variations in PAL programs include not only a multitude of different titles that can be used, but a range of variables which can also be manipulated [59]. In doing so, different outcomes can be achieved: same-age or cross-age tutoring, same gender or mixed gender tutoring, reciprocal or unidirectional, settings (classroom or outside the classroom), intensity (one session per week or five sessions per week of various durations), time of day (inside or after/outside school), targeted domain (social, cognitive, physical), and scope (supporting current curriculum or changing the curriculum) [59].

Despite the inherent shortcomings in measuring physical activity in children and adolescents, and in the school environment [79]; a recent nationally representative survey of over 12,000 students found only 15 per cent of Australian secondary school students were sufficiently active to provide health benefits [80]. Consequently all stakeholders in child and adolescent health, including physical education teachers may need to re-assess strategies to motivate and activate students. This is particularly evident as some teachers report difficulties with engaging students within their classes and physical activity programs [48]. Peer-assisted learning in physical education is potentially one strategy that could be used to overcome some aspects impeding student learning and enjoyment. It is also helpful in addressing the teachers' difficulty in directly observing and instructing each individual student [54]. Furthermore, each student's opportunity to respond and receive higher amounts of feedback and reinforcement from peers as well as teachers [81] could possibly provide opportunities for specific and additional development in the cognitive, psychomotor and affective domains.

The purpose of this systematic review was to evaluate the effectiveness of school-based interventions that specifically include elements of PAL that are incorporated into school

physical education, sport, and/or school physical activity programs for children and adolescents aged 5-18 years. The specific objectives were to evaluate:

i) existing PAL intervention approaches and assess the effectiveness of these approaches on physical activity and physical education participation and behaviours, motor skill performance, health behaviours, psychosocial behaviours and anthropometric outcomes;

ii) the selection criteria and training process undertaken by tutors and tutees in the implementation of PAL interventions.

2.3 Methods

The following databases were searched on January 20th, 2012; AMED (1985 to January 2012); EBM Reviews-ACP Journal Club (1991 to December 2011); EBM Reviews- Cochrane Register of Controlled Trials (4th Quarter, 2011); EBM Reviews- Cochrane Database of Systematic Reviews (2005 to December, 2011); EBM Reviews-Cochrane Methodology Register (1st Quarter, 2012); EBM Reviews- Database of Abstracts of Reviews of Effects (4th Quarter, 2011); EBM Reviews- Health Technology Assessment (1st Quarter, 2012); EBM Reviews- NHS Economic Evaluation Database (1st Quarter, 2012); ERIC (1966 to present); Ovid MEDLINE(R) (1946 to January, Week 2, 2012); Ovid MEDLINE(R) Daily Update (January 20th, 2012); Pre MEDLINE (most recently published); Ovid OLDMEDLINE(R) (1947 to 1965); PsycINFO (1806-January Week 3, 2012); CINAHL (1981–January Week 3, 2012); SPORTS DISCUS (1830 –January Week 3, 2012).

First, three keyword categorical searches were performed (i) ‘school’ or ‘junior high’ or ‘secondary school’ or ‘middle school’ or ‘high school; (ii) ‘peer leader’ or ‘vertical form’ or ‘peer-assisted learning’ or ‘peer tutor’ or ‘school leader’ or ‘social support’ or ‘peer support’ or ‘peer providers’ or ‘peer led initiatives’ or ‘peer social support’; (iii) ‘physical activity’ or ‘PE’ or ‘physical education’ or ‘sport’ or ‘outdoor education’ or ‘adventure therapy’ or ‘Duke of Edinburgh’. Secondly, all categories (i-iii) were combined using ‘AND’ and limited to; studies including humans, reported in the English language, and those that included children and

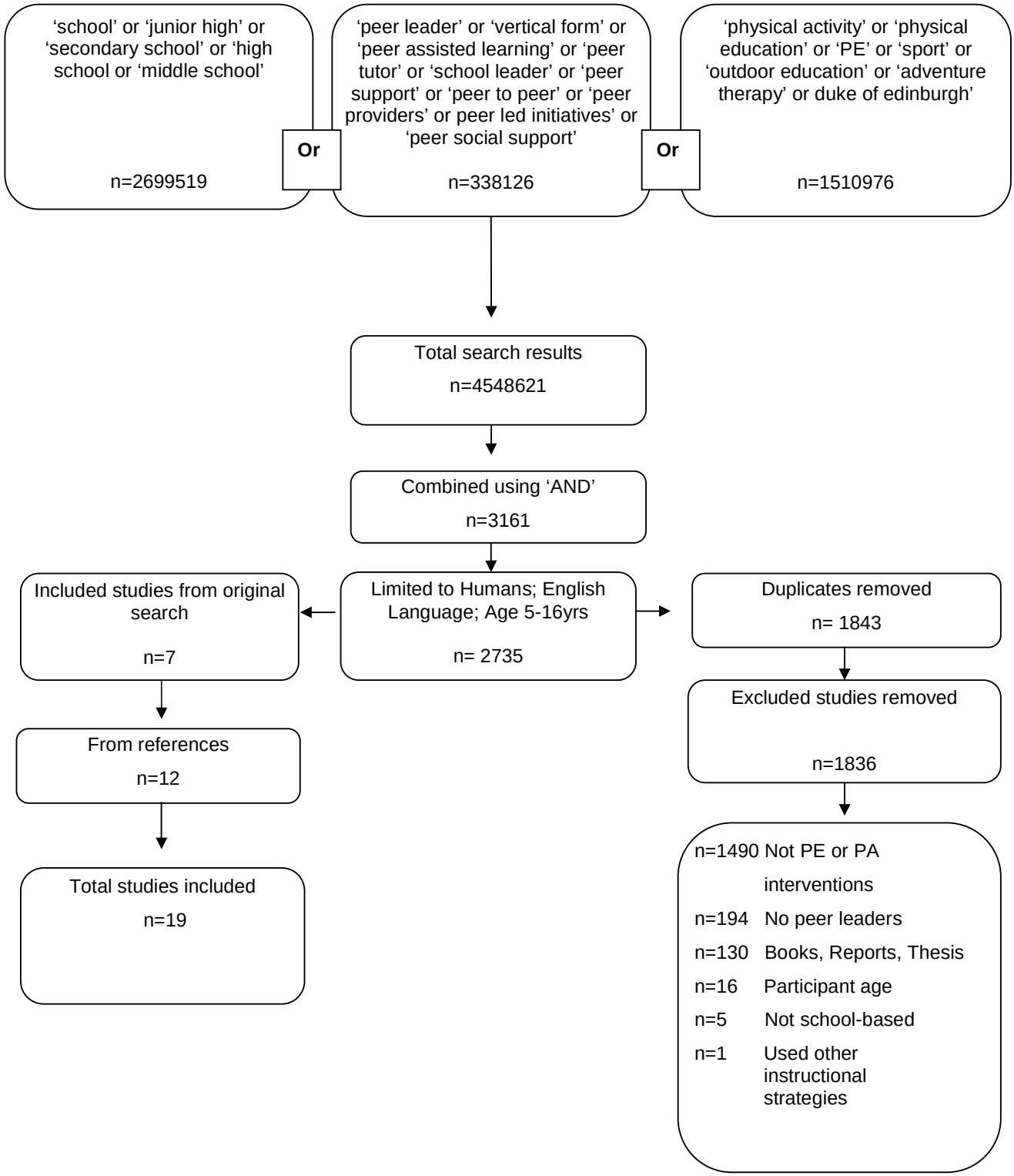


Figure 2.1: Flow diagram of search protocol

adolescents aged 5-18 years. Duplicates were then removed. In addition, reference lists of all publications meeting the inclusion criteria were manually searched to identify any further studies not found through electronic searching (Figure 2.1).

2.3.1 Inclusion and exclusion criteria

Studies that met the following criteria were included in this review:

(i) published in English; (ii) cohorts were children or adolescents (aged 5-18); (iii) physical activity, physical education, or sport interventions; (iv) included a peer-assisted learning component that was reciprocal or unidirectional with peer interactions occurring predominately in dyads (pairs); (v) interventions were in schools; (vi) interventions were conducted post 1990. Thesis, doctoral dissertations, conference proceedings, edited books and structured abstracts were excluded. Subsequent publications derived from these were searched. In addition, cooperative learning interventions were also excluded due to the lack of a defined tutor role. A total of 19 published intervention studies were identified (Figure 2.1). A summary of intervention characteristics can be found in Table 2.1.

2.4 Results

2.4.1 Study design

Substantial methodological variations were observed across studies (Table 2.1). There were four randomised controlled trials [63, 82-84] and one non-randomised controlled trial [85]. Of the 14 other interventions, only one other used a control group [86]. Multiple baseline studies in different variations including single subject designs were used in seven studies [87-93]. Other methodologies included; single subject withdrawal [94, 95], factorial design (2X3) [96] and 4x2 [88], time series design [97], and a case study [98].

2.4.2 Intervention duration (per session and total)

The shortest duration for delivering a single PAL session was between 20-30 minutes [87-90, 95, 99], with the longest duration for a single session being 120 minutes [86, 98] (Table 2.1). Minimal total intervention durations included one lesson [96] and 50 minutes [99]. In contrast, other interventions took place over: 4-12 hours [83, 84, 87, 88, 93, 95, 97], 16-30 hours [63, 82, 86, 89-91, 94]; 32 hours [98] and 60 hours spread throughout a school year [85]. In summary, 15 of the 19 studies were between 8-32 hours in duration and were mostly delivered using single sessions each week to achieve this.

2.4.3 Intervention settings: School context and type of PAL

All interventions took place within the school setting; either in primary (elementary) or secondary (high) schools. Eleven interventions included both the tutor and tutee attending primary school [85, 87-92, 94, 97, 99]. Three studies involved tutees in primary schools and tutors in secondary school [83, 93, 98] and five interventions were conducted completely within secondary schools [63, 82, 84, 86, 96].

Regardless of school type, a total of 13 studies involved same-age tutoring [84, 86-91, 93, 94, 96, 97], with the remaining six interventions involving cross-age tutoring in dyads with older tutors and younger tutees. There were four studies that involved reciprocal PAL [84, 86, 94, 99], two studies incorporated peer-mediated accountability (PMA) [88, 95] and one involved class-wide peer tutoring [87]. The remaining 12 studies used unidirectional tutoring. Only one intervention was delivered across a combined health and physical education class in a whole school approach [85]. Two interventions were delivered outside class time by secondary school tutors to primary age tutees [83, 98]. The remaining sixteen interventions were delivered during physical education or sport lessons. The majority (17 of 19 studies) of the interventions were delivered during curriculum time.

TABLE 2.1: Summary of peer-assisted learning (PAL) interventions in PE, sport and physical activity programs in schools

Author (Date)	SETTING	AGES	WHEN IMPLEMENTED	NAME/ SPORT	DESIGN	INTERVENTION DURATION			PARTICIPANTS		
						Per Session	Total	Total time	Total Participants	Tutors	Tutees
PAL Interventions involving students in schools											
Ayvazo & Ward (2009)	P	S	PE	Volleyball	Single subject withdrawal	48mins	20 lessons	16 hours	n= 4 I = 4 T=4 C= 0 ®	n=4 M=2 F= 2 Age= NR (4- 6th grade)	n=4 M=2 F= 2 Age= NR (4- 6th grade)
Byra & Marks (1993)	P	S	PE	Soccer-juggling & dribbling	Comparative research design (4x2)	25mins	2 lessons	50 minutes	n= 32 I = 32 T=32 C= 0 ®	n=32 M=14 F= 18 Age= 9-12	n=32 M=14 F= 18 Age= 9-12
d'Arripe-Longueville, Gernigon, Huet, Cadopi, & Winnykamen (2002)	Sec	S	PE	Swimming	Factorial design (2x3)	1 lesson	1 lesson	1 lesson	n=96 I=48 T=48 C=0 Uni	n=48 M=24 F=24 Age= x̄ 18.5	n=48 M=24 F=24 Age=x̄ 18.3
Crouch, Ward & Patrick (1997)	P	S	PE	Volleyball	Single subject withdrawal	20-30mins	20 lessons	6 hours	n=67 I=67 T=67 C=0 PMA	n=67 M=36 F=31 Age= NR (4- 6th grade)	n=67 M=36 F=31 Age= NR (4- 6th grade)
Ensergueix & Lafont (2010)	Sec	S	PE	Table Tennis	Factorial design (2x3)	120mins	8 weeks	16 hours	n=72 I=48 T=48 C=24 ®	n=48 M=NR F=NR Age= x̄ 15.1	n=48 M=NR F=NR Age=x̄ 15.1
Ernst & Byra (1998)	Sec	S	PE	Juggling	RCT	35mins	8 lessons	4.4 hours	n=60 I=48 T=48 C=12 ®	n=48 M=NR F=NR Age= NR (6th – 9th grade)	n=48 M=NR F=NR Age= NR (6th – 9th grade)

Johnson & Ward (2001)	P	S	PE	Striking skills	Multiple base line design	25 mins	20 lessons	8.3 hours	n=11 I=11 T=11 C=0 ©	n=11 M= 3 F=8 Age= 7-8	n=11 M=3 F=8 Age= 7-8
Lubans, Morgan, Aguiar, & Callister (2011)	Sec	X	SPORT	PALs Program Elastic tubing Gymsticks™	RCT	30-90 mins	26 weeks	~ 26 hours	n=100 I=50 T=100 C=50 Uni	n=100 M=100 F= 0 Age= x̄ 14.3 (9th grade)	n=NR M= NR F= 0 Age= NR (7th grade)
Peralta, Jones, & Okely (2009)	Sec	X	PE	FILA-Fitness Improvement Lifestyle Awareness	RCT	100 mins	16 weeks	24 hours	n=33 I=16 T=NR C=17 Uni	n=NR M=NR F= 0 Age=NR (11th grade)	n=33 M=33 F= 0 Age= 12-13 (7th grade)
Smith (2011)	P&Sec	X	After school	Just for Kids! (Modified from)	RCT-pilot study	60mins	8 weeks	8 hours	n=85 I=35 T=13 C=37 Uni	n=13 M=NR F= NR Age=NR (10-11TH grade)	n=72 M= 22 F= 50 Age= x̄ 8.51-12.0 (3rd-4th grade)
Stock, Miranda, Evans, Plessis, Ridley, Yeh, & Chanoine (2007)	P	X	HAPE	'Healthy Buddies'	NRCT- pilot study	90mins	40 weeks	60 hours	n=383 I=116 T=116 C=151 Uni	n=116 M= NR F=NR Age=NR (4-7TH grade)	n=116 M= NR F= NR Age= NR (K- 3rd grade)
Ward, Smith, Makasci & Crouch (1998)	P	S	PE	Basketball lay up	Multiple base line design	20-30mins	20 lessons	6 hours	n=55 I=55 T=55 C=0 PMA	n=55 M= 31 F=24 Age=NR (4-5TH grade)	n=55 M= 31 F=24 Age=NR (4-5TH grade)
PAL Interventions involving students with a disability in schools											
Brown (1993)	P&Sec	X	Outside school hours	'CARE'	Case study	120mins	16 weeks	32 hours	n=113 I=66 T=47 C=0 Uni	n=47 M=NR F= NR Age= NR (High school)	n=66 M=NR F=NR Age= NR (Elementary school)
Houston-Wilson, Dunn, Dunn, van der Mars, & McCubbin (1997)	P	S	PE	Discrete Motor Skills	Delayed multiple baseline design	30mins	NR	29 hours	n=12 I=12 T=6 C=0 Uni	n=6 M=2 F= 4 Age= 9-11	n=6 M=5 F= 1 Age= 9-11

Klavina & Block (2008)	P	S	PE	GPE	Single subject delayed multiple baseline design	30mins	46 lessons	23 hours	n=12 I= 3 T=9 C= O Uni	n=9 M=NR F=NR Age= -9	n=3 M=1 F=2 Age= 8-9
Lieberman, Dunn, van der Mars, & McCubbin (2000)	P	S	PE	GPE	Single subject delayed multiple baseline design	45mins	32 lessons	24 hours	n=16 I=8 T=8 C=0 Uni	n=8 M=4 F=4 Age=NR (4-6TH grade)	n=8 M=4 F=4 Age=NR (4-6TH grade)
Lieberman, Newcomer, McCubbin & & Dalrymple(1997)	P	X	PE	GPE	Single subject delayed multiple baseline design	35mins	NR	NR	n=12 I=6 T=6 C=0 Uni	n=6 M= NR F= NR Age= NR (5th grade)	n=6 M=NR F= NR Age= NR (K-2nd grade)
Strickland, Temple, & Walkley (2005)	P	S	PE	Fundamen-tal motor skills-striking	Time series design	6 lessons	6 lessons	6 lessons	n=10 I=5 T=5 C=0 Uni	n=5 M= NR F= NR Age= x̄ 10.1	n=5 M= NR F=NR Age= x̄ 10.1
Wiskochil, Lieberman, Houston-Wilson, & Petersen (2007)	P&Sec	S	PE	GPE	Single subject delayed multiple baseline design	6-8 lessons	6-8 lessons	6-8 lessons	n=8 I= 4 T=4 C=0 Uni	n=4 M=NR F=NR Age= NR (3-11th grade)	n=4 M=2 F=2 Age= NR (3-11th grade)

Note: C= control; © class-wide peer tutoring; F= females; HAPE= both health and physical education classes; High school= Secondary school; I = intervention group/tutees; K= Kinder- first year of school approximate age 4/5 years old; M= males; n= total number in intervention; NR=Not reported; NRCT= Non randomised control trial; P= Primary school ; PE= physical education; PMA= Peer-mediated accountability tutoring model; P&Sec= combined Primary & Secondary school; ®= reciprocal tutoring; RCT= randomised control trial; S=Same-age tutoring; Sec=Secondary school; T=tutor; Uni= Uni-directional tutoring; x̄ = mean age; X=Cross-age tutoring.

2.4.4 Participants: Tutors and tutees

In general, sample sizes were small (Table 2.1). A total of eight studies had between three and 11 tutees [87, 89-94, 97], with the largest number of tutees in an intervention 116 students [85]. Similarly, the number of tutors involved varied greatly, with the smallest being four tutors [93, 94] and the study with the largest number of tutors cited 116 students [85]. The ratio of tutors to tutees was one to one in 16 of the 19 studies. Three studies did not clarify their specific ratio although intervention protocol suggests didactic relationships [63, 82, 83].

2.4.5 Participants: Age and gender

Most tutees were in primary school (14 of 19 studies), this included two studies with tutees in their first year of school (Kinder: approximately 5 years old) [85, 92]. Of the five secondary school interventions, reported tutees ages ranged from 12 to 18.3 years [82-84, 86, 96]. Twelve studies failed to report all mean age ranges of participants, tutors or tutees however, they did report school year levels [63, 82-85, 89, 91-94, 98, 100].

Only two studies included males only as tutees [63, 82]. Of the remaining 17 studies that included both males and females as tutees, seven studies failed to separately report the number of males and female tutees involved in their study [63, 84-86, 92, 97, 98]. Ten studies lacked a description of the ratio of male and female tutors [82-86, 90, 92, 93, 97, 98]. The remaining nine interventions reported the number of both males and females as tutors. Two studies had male only tutors [63, 82].

In summary, the youngest reported tutor age was 7 years, the oldest 18.5 years old. Over half of the studies reported both males and females as tutees, and studies generally had between four and 11 tutors with as many as 116 students as tutors. Twelve interventions were unidirectional, six involved cross-age tutoring and 13 same-age tutoring.

TABLE 2.2: Tutee and tutor selection criteria and training processes

Author (Date)	DURATION		TUTOR/TUTEE RELATIONSHIP		TUTOR SELECTION CRITERIA							TRAINING RECEIVED BY TUTORS						
	Training (total time)	Number of training sessions	Same class OR Same school/nearby	Gender matched	Proficient/appropriate level FMS	Volunteered/ Desire to be tutor/ Previous experience	Teacher recommendation	Few behavioural problems/Attendance	Pass Test /Fitness test	Friends		instructing	Modelling/ demonstrating Physical guiding		feedback	Error correction	Practice	On- going training provided
PAL interventions involving students without a disability																		
Ayvazo & Ward (2009)	48mins	1	✓		✓			✓				✓	✓	✓	✓		✓	
Byra & Marks (1993)	None	NA	✓		✓	✓				✓								
Crouch, Ward & Patrick (1997)	None	N/A	✓															
d'Arripe-Longueville, Gernigon, Huet, Cadopi, & Winnykamen (2002)	None	None	✓	✓	✓	✓												
Ensergueix & Lafont (2010)	120mins	8	✓	✓	✓				✓			✓	✓		✓			
Ernst & Byra (1998)	None	NA	✓		✓	✓												
Johnson & Ward (2001)	25mins	1	✓	✓	✓			✓				✓	✓		✓	✓	✓	
Lubans, Morgan, Aguiar, & Callister (2011)	90mins	3	✓				✓											
Peralta, Jones, & Okely (2009)	20mins	1	✓				✓		✓									
Smith (2011)	360mins	2	✓			✓	✓					✓	✓		✓			
Stock, Miranda, Evans, Plessis, Ridley, Yeh, & Chanoine (2007)	45mins	NR	✓															

Ward, Smith, Makasci & Crouch (1998)	None	NA	✓	✓	✓														
PAL interventions involving students with a disability																			
Brown (1993)	NR	NR	✓			✓													
Houston-Wilson, Dunn, Dunn, van der Mars, & McCubbin (1997)	30mins	2	✓		✓	✓	✓		✓			✓		✓	✓				
Klavina & Block (2008)	30mins	3	✓			✓	✓		✓		✓	✓	✓	✓	✓	✓			
Lieberman, Dunn, van der Mars, & McCubbin (2000)	30mins	4/5	✓	✓		✓		✓	✓		✓	✓	✓	✓	✓		✓		
Lieberman, Newcomer, McCubbin, & Dalrymple (1997)	150mins	1	✓		✓	✓			✓		✓	✓	✓	✓	✓	✓			
Strickland, Temple, & Walkley (2005)	1xlunch time	1	✓	✓		✓		✓			✓	✓		✓	✓	✓			
Wiskochil, Lieberman, Houston-Wilson & Petersen (2007)	60-120 mins	1	✓	✓		✓			✓		✓	✓	✓	✓	✓	✓			

Note: ✓ = intervention required this relationship, skill, behaviour or training process; mins=minutes; NR= not reported; none= no training given to tutors.

2.4.6 Selection criteria

Tutors were required to meet various inclusion criteria to take part in interventions (Table 2.2). Inclusion criteria were based broadly on behaviour, school circumstance, and skill or task completion. All interventions were conducted where tutors and tutees were in the same class or schools nearby. Eleven tutors were selected by volunteering, had a desire to be a tutor or had previous tutoring experience [83, 84, 89-93, 96-99]. A total of seven interventions required that their tutors were competent enough to pass a fitness, skill or knowledge test in the relevant context [82, 86, 89-93]. Similarly nine of the 19 interventions required a proficient or appropriate skill level of tutors as determined by those conducting the study. Tutee and tutor selection required gender matching in seven of the 19 studies (Table 2.2).

2.4.7 Training of tutors

The specific training process for tutors was not reported or tutor training was not completed in six studies [84, 88, 95, 96, 98, 99] (Table 2.2). In contrast, variations of between 20 minutes and six hours of training were provided for tutors [82, 83]. Only one intervention reported providing ongoing training for tutors [91].

In summary, 13 of the 19 studies provided some training for tutors. However, the quantity and quality of training received and the information or strategies used varied greatly (Table 2.2). Information was provided in some interventions on how to deliver appropriate instructions to peers, how to model skill-based activities, and the types of feedback available to communicate. It is evident that studies involving students' with disabilities provided more comprehensive training for tutors.

2.5 Intervention outcomes

A summary of the objective, observational and subjective measures used by studies to assess various outcomes can be found in Table 2.3. Nine of the 19 studies reported statistically significant results after PAL interventions.

2.5.1 Anthropometric measures

Despite its widespread use in population studies, the use of BMI is often challenged [101, 102] and therefore BMI data should be interpreted with caution. The 'Healthy Buddies' non-randomised controlled trial (NRCT) reported significant changes to height and weight for the control and intervention participants ($p<0.001$) [85]. The study involved the weekly delivery by older students (4^{th}-7^{th} Grade) of 30 minutes of relevant theory and two 30 minute physical activity sessions per week over the 40 week school year intervention period to younger 'buddies'. Changes to BMI and heart rate between baseline and follow up were not significantly altered. Anthropometric changes were not the primary outcome for this study and it is usual to expect maturational changes in this age group over a period of a school year.

Tutees also experienced a significant reduction in BMI percentile ($p<0.05$) for the intervention group participating in a teen mentoring program modelled on the Just for Kids! Program [83]. Conducted after-school, the 60 minute sessions conducted over eight weeks included tutees and tutors spending 50 minutes on task-oriented activities pertaining to exercise choices, daily activity and food. In addition, there was a further 10 minutes of physical activity and games when all groups joined together. The high school tutor and primary school tutee ratio was 1:1 or 1:2.

Despite reporting small to medium intervention effect sizes for a range of outcomes measured, there were no significant changes to students' BMI ($p=0.50$), waist circumference ($p=0.27$), or percentage body fat ($p=0.30$) in the 'Fitness Improvement and Lifestyle Awareness Program' (FILA) [82]. Over 16 weeks, Year 7 boys were involved in a weekly 60

TABLE 2.3: Outcomes from peer-assisted learning (PAL) interventions in PE, sport and physical activity programs in schools

Author (Date)	SKILL PERFORMANCE MEASURES		PHYSICAL ACTIVITY/ PHYSICAL EDUCATION BEHAVIOUR MEASURES			HEALTH/NUTRITION BEHAVIOUR MEASURES	PSYCHOSOCIAL MEASURES		ANTHROPOMETRIC MEASURES
	Objective	Observation	Objective	Observation	Survey	Survey	Survey	Observation	Objective
PAL Interventions involving students in schools									
Ayvazo & Ward (2009)	✓	✓		✓					
Byra & Marks (1993)			*						
Crouch, Ward & Patrick (1997)	✓								
d'Arripe-Longueville, Gernigon, Huet, Cadopi & Winnykamen (2002)	*	*					*		
Ensergueix & Lafont (2010)	*	*					✓		
Ernst & Byra (1998)	*								
Johnson & Ward (2001)	✓	✓							
Lubans, Morgan, Aguiar & Callister (2011)			✓			*			*
Peralta, Jones & Okely (2009)			*			X			X

Smith (2011)						*✓				*
Stock, Miranda, Evans, Plessis, Ridley, Yeh & Chanoine (2007)				*		*✓				*
Ward, Smith, Makasci & Crouch (1998)	✓									
PAL Interventions involving students with a disability in schools										
Brown (1993)								✓		
Houston-Wilson, Dunn, Dunn, van der Mars & McCubbin (1997)	✓			✓						
Klavina & Block (2008)				✓	✓		✓			
Lieberman, Dunn, van der Mars & McCubbin (2000)				✓	✓					
Lieberman, Newcomer, McCubbin & Dalrymple (1997)				✓	✓					
Strickland, Temple & Walkley (2005)	*	*								
Wiskochil, Lieberman, Houston-Wilson & Petersen (2007)				✓	✓					

Note: ✓= positive changes or increases to performance/behaviour; *****= significant results $p<0.05$; skill performance measures- no subjective measures were used; health/nutrition behaviour measures- no objective measures used; x= recorded but no significant outcomes.

minute curriculum session during physical education and two 20 minute lunchtime modified games and activity sessions lead by Year 11 male peer leaders. In contrast, the 'Physical Activity Leaders' (PALs) program also conducted with adolescent boys found a significant beneficial intervention effect for BMI ($p<0.001$) and a significantly decreased prevalence of overweight and obesity in the peer leaders intervention group ($p<0.001$) [63]. This intervention involved Year 9 boys conducting their own physical activity and leadership program, and delivering knowledge learnt relevant to resistance training to Year 7 boys during six lunchtime sessions in a cross-age tutoring environment over the intervention period of 26 weeks. The PAL program is the only study included in this review which provided peer leader outcomes (Year 9 boys) and no peer tutee outcomes (Year 7 boys).

2.5.2 Health/nutrition behaviours

The aforementioned 'Healthy Buddies' study yielded more significant outcomes with changes in health knowledge ($p<0.01$) and health behaviour ($p<0.001$), both measured via self-report [85]. These were recorded in tutee intervention groups across various ages (Kinder to 7th Grade).

There was a significant reduction in the reported consumption of sugar containing beverages ($p<0.05$) in the Year 9 peer leaders intervention group involved in the PAL's program [63]. The FILA intervention also recorded the beverage intake of students, but no changes in the intervention group were found.

The 3rd and 4th grade students involved in the Just for Kids! modelled intervention reported nutritional changes post intervention. There was a significant increase in students' reported behavioural intention to 'eat healthfully' ($p<0.05$), and a significant increase in nutritional knowledge ($p<0.05$) [83].

Of the four studies that used PAL to measure anthropometric and health/nutrition outcomes, all used cross-age tutoring in either primary [85], or secondary schools [63, 82] or a combination of primary and secondary schools [83].

2.5.3 Physical activity and physical education: Participation and behaviours in class

The interactions displayed by three students with severe mental disabilities and their nine tutors were assessed during an inclusive elementary physical education class [77]. Class tutees were provided with three instructional support conditions including: the physical education teacher starting the lessons, their tutors providing peer mediated support during the skill activities, and voluntary support which they received from their peers during game time. Although no significant changes occurred, overall time engaged in physical activity increased for all tutees as measured by the Computerised Evaluation Protocol of Interactions in Physical Education tool (CEP-PI) which codes instructional, physical and social interactions of students [90].

The primary objective of a similar elementary physical education study was to see the effect cross-age trained tutors had on the percentage of time tutees with a disability spent engaged in motor appropriate behaviour [92] as defined by their ALT-PE [103]. Findings suggested that ‘on task’ time specific to the activities increased. Results were similar in two further interventions that used the ALT-PE measurement tool for students with hearing difficulties [91] and students with visual impairments [93] participating in inclusive physical education classes with tutors.

Findings across all four studies suggest that interactions between tutees and teachers decreased, indicating tutees had less reliance on their physical education teacher and greater interaction with their tutors. Each of these studies used various measures to assess ‘on task’ time for students with disabilities in physical education classes including direct

observation, CEP-PI and ALT-PE to assess participation. Although none of the studies had control groups and sample sizes were very small with the maximum eight tutees and nine tutors, this represents the usual nature of an inclusive or integrated physical education environment.

The 'Healthy Buddies' intervention reported statistically significant improvements in physical activity participation ($p<0.01$) in intervention groups across various ages (Kinder to 7th Grade) [85]. However, the physical activity outcome was the increase in distance covered during the nine minute run, an effect that could potentially be attributed to the maturation or the training of subjects over 40 weeks.

The Year 7 boys that participated in the curriculum and lunchtime activities with their peer leaders significantly improved their weekday ($p=0.06$) and weekend ($p=0.04$) vigorous physical activity after the 6-month FILA intervention [82]. Although not significant, the PAL's program noted trends in changes to physical outcomes, including test results of upper body muscular endurance ($p=0.09$) and abdominal strength ($p=0.07$) of the Year 9 boys who were leading Year 7 boys during resistance training [63].

In primary school physical education classes, the impact of pairing students in friendship dyads and by skill ability was investigated using soccer juggling and dribbling across two 25 minute classes [99]. Each dyad was assigned a pre-service teacher to provide them with instructional information prior to their completion of reciprocal tasks. Those paired with a friend provided specific feedback at a higher rate per minute than learners not with friends and the control group ($p<0.05$). Pairing by skill ability had little effect on the amount or specific feedback given. Similarly, those paired with friends were more comfortable when receiving feedback than those not with friends ($p<0.05$) [99].

Overall, four studies with the aim of improving physical education, physical activity participation or associated behaviours used same-age tutoring in both primary and

secondary schools, with a one to one ratio [90, 91, 93, 99]. The remaining four interventions measuring changes in participation used cross-age tutoring in two secondary schools [63, 82] and two primary schools [85, 92].

2.5.4 Motor skill development and performance

The assessment of tutoring and how it affects skill level in a one off swimming lesson found significant changes to skill performance [96]. Tutors demonstrated a breaststroke turn to their tutee, which was followed by eight minutes of tutees training freely with the tutor. During this time, the number of trials, demonstrations and verbal interactions were recorded. Results were recorded immediately after the free training and then two weeks later. Comparing tutee achievement and tutor skill level revealed a significant relationship ($p<0.001$); showing the learners who were paired with novice skill level tutors failed to perform as well as a learner paired with a skilled tutor. Gender significantly influenced skill level, with skilled male tutors demonstrating significantly better results in their tutee outcomes than skilled female tutors ($p<0.01$). The number of attempts and demonstrations were influenced by the interaction with tutors, with male tutees more likely to have greater attempts than female tutees ($p<0.01$).

Pairing of secondary school students in a reciprocal juggling task over a period of eight lessons provided the opportunity to examine the effects of pairing learners by motor skill ability and the effect this would have on skill performance and cognitive performance [84]. Juggling was utilised as it was a novel task to all students and none had received any formal instruction prior to the study. Students' level of juggling expertise was assessed prior to the intervention as high or low and they were then assigned in same gender dyads of similar ability or with a partner of different ability. The teacher started the class with instructions before dyads conducted their own reciprocal tutoring. The study found that low-skilled learners showed significant improvement from pre to post-test for both skill technique ($p<0.01$) and skill outcome ($p<0.02$) regardless of with whom they were paired. The high-skilled learners who were paired with low-skilled learners also improved significantly

however, only for the skill outcomes ($p<0.01$). Significant changes over the eight lesson intervention of knowledge of skill components required in juggling were also recorded by the high-high, high-low and low-low skilled learners ($p<0.01$) [84].

The number of trials attempted and number of correct trials increased in a sixth grade class-wide peer teaching volleyball intervention [94]. All tutors underwent training and were placed in the same team to complete volleyball tasks presented on cards. Practising was then allowed and peer tutoring commenced with tutees and tutors changing roles and teams completing tasks as appropriate. Video analysis was used to examine the total number of trials and correct trials performed. This study supports the trend of a greater number of attempts and correct trials when using class-wide peer teaching in striking skill applications [87] and swimming [96].

Although using a different peer tutoring condition, the number of trials also increased during one-minute time periods of volleyball setting and digging skills in a 4-6th grade primary school physical education setting using peer-mediated accountability (PMA) [95]. The assessment of the effects of peer-mediated accountability (PMA) includes having dyads working together but they are guided by elements such as teacher-established goals, peer recording of performance, public display of student performances and the use of games for rewards [52, 95]. The sequence of the lesson to complete the volleyball tasks was as follows: a whole group instruction (work individually), followed by working in peer dyads and then PMA. Overall, there was an increase in the number of trials performed. The frequency and percentage of correct trials increased and were most apparent in the peer-mediated accountability conditions in contrast to the individual and dyad conditions [95].

Over a longer period of time (2.5 minutes) than the above-mentioned study, peer-mediated accountability was used in a primary school study that focused on basketball layups [88]. This study also found for average skilled students the number of trials performed at least

doubled from baseline. Peer-mediated accountability was effective in increasing the opportunities to respond for both average and low-skilled students [88].

A table tennis intervention using reciprocal peer tutoring found significant changes in motor skill development over eight weeks ($p<0.001$) and benefits of having the same gender tutors ($p<0.001$) [86]. Findings suggest implementation of reciprocal peer tutoring leads to superior motor performance for tutees, in contrast to individual practice time with no tutoring and students completing reciprocal peer tutoring with tutors who did not have any training [86]. Tutors' behaviours during interactions were stipulated by a set of rules including; observing their tutee attentively, reminding and demonstrating what should be done, allowing tutees to ask questions, comforting and encouraging when tutee was in difficulty and congratulating them upon successful task completion. Students were randomly assigned to one of the three conditions.

Significant improvements in performance of the fundamental motor skills, the forehand strike ($p<0.03$) and two handed side arm strike ($p<0.01$) were observed in students with a mild intellectual disability after they had been tutored in a physical education class over six lessons [97]. To achieve this, pre and post tests were conducted following a physical education class in which the teacher taught the warm up and skill activity and the tutor worked with the tutee during the skills session. Tutors were instructed to listen to the teacher, tell the tutee about the activity, demonstrate the skill, observe their tutee's performance and give specific or corrective feedback [97].

Despite the primary outcome of the study focusing on motor performance of discrete skills, the effectiveness of peer tutors was also evaluated in an integrated primary school physical education class [89]. Six typically developing peers served as peer tutors to six participants with developmental disabilities. Two 30 minute training sessions were provided for peer tutors. Following a warm up, and fitness activity; in the skill focus component of the lesson, tutees were analysed for the presence/absence of five critical elements that would make up

each skill (jump, catch, throw, strike). Each participant was videotaped for the entire class with the focus on only the skill. Findings suggest that trained peer tutors were deemed effective at assisting participants to improve their motor performance while untrained peer tutors were not [89].

In summary, in studies where peer tutors had higher skill knowledge and skill performance ability [84, 96, 97], and received training prior to their tutoring roles in a reciprocal peer teaching context [86, 89], significant or positive changes to measured outcomes of tutees occurred. All of the eight studies that reported changes to motor performance or behaviours involved same-age tutors in both primary and secondary school environments.

2.5.5 Psychosocial outcomes

The nature of the research publication or study methodology may have limited some studies to report only positive qualitative psychosocial trends, including that from the CARE (Children's Art and Recreation Experience) program [98]. It was presented by 'buddies' for two hours per week on Saturday mornings for eight weeks. Trained high school 'buddies' joined a student with special needs aiming to support the students' engagement in both art and physical activity experiences. The physical activity element was guided by an experienced physical education teacher, who introduced ideas to 'buddies' and who, in turn, adapted activities to their 'little buddies' capabilities.

In contrast, a quantitative study has shown learners who had tutors during a short duration intervention requiring the completion of a set swimming skill demonstrated improvements in both skill level and self-efficacy ($p<0.05$) [96]. Self-efficacy was also measured during a table tennis reciprocal peer tutoring intervention, with strong positive correlations between self-efficacy and having a trained female tutor compared with no correlation when tutees had an untrained male tutor [86].

2.6 Discussion

Peer-assisted learning (PAL) is a teaching strategy employed in both primary and secondary schools, in the general classroom and physical education. Research pertaining to PAL in the general classroom has been comprehensively acknowledged previously, so our purpose in reviewing recent articles was to specifically assess the potential of PAL interventions for influencing physical and health enhancing behaviours. We found limited evidence of the effect of PAL when used in physical education, during sport or school-based physical activity interventions with only 19 articles meeting the criteria for inclusion in this review. Despite support for and success of PAL in other contexts and subject areas within schools, there are less than 20 rigorously implemented and evaluated interventions in the physical education and physical activity areas in schools that have been published.

2.6.1 PAL: Teaching in physical education for skill development and performance outcomes

Of the few studies found in this review documenting variations of PAL, the available data unsurprisingly supports that implementation within different subject areas of the curriculum will lead to different outcomes. Of those interventions delivered only within the physical education and sport that measured changes in skill performance and development (n=9), four resulted in significant outcomes in striking skills [97], swimming [96], table tennis [86], and juggling [84]. Other positive outcomes occurred in volleyball [94, 95] and in discrete skills such as the basketball layup [88], striking [87] and throwing and catching [89].

The key issue in these afore-mentioned studies is there is a lack of comparison with other teaching methods and strategies that teachers may use to achieve similar skill-based outcomes. Furthermore, students' usual method of practice and skill level that was previously developed within the class was reported in few studies and therefore it is difficult to assess the isolated effectiveness of the application of PAL on both tutees and tutors. Additionally, the changes that occurred across one discrete swimming or striking skill do not

represent the typical physical education class in which usually both discrete and serial skills are taught and developed. Therefore, in the future it would be important to compare a PAL model with usual teaching practice to be able to determine if any extra benefit obtained in skill development was due directly to the peer learning strategies.

2.6.2 PAL: A multi-component approach

Of the four studies measuring health outcomes, three were delivered within the school curriculum, and one after school. Three reported significant and favourable health-related changes [63, 83, 85]. When combining the intervention delivery across both the physical education and health curriculum, the 'Healthy Buddies' study demonstrated significantly improved health knowledge of different food values, physical activity behaviours, healthy living choices and healthy living attitudes of participants after a year-long intervention [85]. Similarly, an after-school program designed to foster both health and physical activity outcomes also produced significant outcomes [83].

These findings are consistent with previous studies [37, 38, 75] suggesting a whole curriculum approach (using both physical education and health education) could further enhance the range of outcomes students obtain. However, it is unlikely that a 'whole' package approach will suit all students and schools, particularly in a cross-age PAL intervention. Careful consideration of individualised strategies to implement PAL interventions is therefore essential to ensure they integrate not only theoretical but also practical concepts. In addition it is imperative that where an intervention is best suited within the school program is assessed. An example of this is the PAL program which focused on resistance training for adolescent boys to achieve a range of outcomes across physical activity, health and anthropometric measurements [63]. The program involved Year 9 leaders not only completing their own program, but also introducing resistance training to Year 7 boys via PAL. Although tutee outcomes were not measured, the program utilised a

training method which is popular and has recorded success with adolescent boys and provided a supportive cross-age PAL environment both in and outside curriculum time [63].

2.6.3 Dyad/group selection

Improvements to psychosocial outcomes were recorded in four studies that all involved same-age and same gender tutoring [86, 90, 96, 98]. These findings draw attention to the importance of the selection process of tutors and the impact this may have on both the primary and secondary outcomes of studies. Findings suggest that tutors with more proficient motor skills and knowledge of the task can assist tutees to gain greater positive psychosocial outcomes and consequently improve tutee performance [50, 84, 86, 96]. This may be attributed to the tutees having more confidence in their tutors and therefore applying themselves more comprehensively to the task at hand.

The appropriate pairing of the dyad or group during PAL activities cannot be understated, as this appears to be a crucial component to any PAL intervention. Gender-based studies suggest girls rather than boys are more effective tutors, although may not benefit as much as males in tutoring outcomes [50]. Girls are also more task orientated than boys in tutoring environments [50]. In comparison, boys tend to focus on developing their own knowledge, comparing themselves with others, being competitive and may show stronger performance gains than females [50, 96, 104]. This may not always be the case, with some females regardless of ability performing similarly to males [87]. Increases in female self-efficacy also suggests that same gender tutor and tutee roles may be highly beneficial for females [86]. The equivocal findings on effective tutoring in same-gender and cross-gender contexts indicates further research is required. Furthermore, the proposed pairing of dyads with friends to provide a higher rate of feedback and increase the comfort level of the tutee in receiving feedback showed positive associations [88] and warrants further investigation.

2.6.4 PAL: The effectiveness of cross-age, same-age, reciprocal and unidirectional tutoring

With 13 of the 19 studies being conducted in same-age contexts, it is difficult to assess which PAL strategy is most appropriate to use to modify performance and certain behaviours. However, it is evident that all interventions that were focused on developing motor behaviours used same-age tutoring. In contrast, all interventions seeking health-related changes all involved cross-age tutoring.

As many of the skill behaviours and performance interventions were conducted over short durations, the benefits of using peer tutoring to provide feedback at a higher rate and the benefits of immediate task related information to the learner are invaluable [105]. Consequently, the increased amount, immediacy and content of feedback, in addition to the ability to practice tasks may have led to improved motor performances. If the intervention involved reciprocal rather than unidirectional tutoring, opportunities for improvements to performance would have been apparent for both students in the dyad.

Same-age tutoring also provides a unique context where peers may possibly have more insight into how to best communicate and interact with people of the same-age. Additionally, they have greater insights into learning difficulties of their peers and learning by teaching provides great social reinforcement [51]. Cross-age tutoring is more likely to enable the tutor to demonstrate greater knowledge, eliminate the competitive element between peers and protect the tutees self-esteem [106]. It is therefore not surprising that this approach was used for the health behavioural interventions where knowledge was often passed from the tutor to tutee. The consideration and selection of different PAL strategies may be largely guided by the outcomes desired; we can conclude that interventions concerned with improving skill performance and behaviours tended to favour and effectively use same-age tutoring. In contrast, cross-age tutoring was used more frequently in interventions with the intention of providing and promoting knowledge.

2.6.5 Intervention duration

Potentially, enhanced exposure to an intervention could result in a greater impact on participants. However, in general the duration of the intervention was indeterminate of outcomes. Therefore, conclusive statements cannot be drawn about the optimal time length for a PAL intervention. Significant changes occurred in PAL interventions with minimal duration of only one lesson [96] in contrast to as long as 40 weeks [85]. Within the classroom, it is certainly feasible that a one off Maths or English class may develop 'skill or concept knowledge', but the longevity and retainment of that knowledge will take further practice and application throughout future classes. Similarly, the three interventions which resulted in significant motor skill performances [86, 96, 97] highlight the ability to improve motor skills over minimal time periods (1, 6, and 8 lessons) and therefore it appears that interventions targeting motor skill adaptations could indeed develop from a single exposure to PAL. However, similar to learning in Maths or English, being able to ingrain this skill for long term application may be conditional on practice and further application. Adherence and improvements in motor skills may indeed replicate the process of adherence to physical activity whereby the Transtheoretical Model [107] indicates that maintaining behaviours takes longer than six months and relapses are common. In summary, duration of a PAL intervention needs to consider whether the desired outcomes need to instigate acute or chronic changes in participants.

2.6.6 Training duration and implementation

The inferences that training or training of a longer duration may lead to more effective tutoring and consequently tutee outcomes (skill or behaviour) is partly supported by the results of this review (Table 2.2). The findings of substantive gains for students who were tutored by trained versus untrained tutors [89] contrasts with the four studies with significant findings that had training durations for their peer tutors of a single lunch time [97], for 20 minutes in duration [82], or had no training at all [84, 96]. These findings suggest it is plausible that significant outcomes for tutees, after their tutor had minimal or no training

exposure could be expected in skill outcomes and potentially physical activity participation (Table 2.3). The effectiveness of trained verses untrained tutors has been questioned previously [50] and remains unresolved with several studies providing conflicting results in this review.

The modification of motor skill performance outcomes over short-term periods is in direct contrast to studies that are seeking harder to modify long-term outcomes of psychosocial or health behaviours. Potentially this could explain the effectiveness of the 6-hours of training provided in the Just for Kids! randomised controlled trial which resulted in significant and positive outcomes concerning health and nutrition behaviours of tutees. In summary, it is apparent that the duration and implementation of training programs for tutors should be carefully considered; results suggest that the number and type of outcomes to be modified by the intervention will greatly determine this.

2.6.7 Training protocol

This review draws to attention the training process undertaken by tutors during interventions involving students with a disability were far more rigorous than in other studies in this review (Table 2.2). Furthermore, a selection of studies included testing to ensure tutors were aware of appropriate strategies and tutoring methods to use with their tutees with a disability [89-93]. Ensuring that tutors are knowledgeable, competent and understand the context in which they are tutoring certainly supports the findings of greater on-task physical activity and academic time of tutees. However, the lack of evaluation of the tutor training also highlights future interventions should consider the effectiveness of their training process. They need to equip tutors with the appropriate skills and knowledge that will enable them to work optimally with their tutee to maximise the benefits to both themselves and those that they are working with. The limited reporting of the training methodology used with tutors does not allow definitive conclusions to be made regarding the most effective tutor training strategies, duration or testing procedures, nor does it support the external validity of the

results. This highlights previous findings of the lack of reporting of training protocol and the effects of being a tutor in a physical education environment [50].

2.6.8 PAL: Children and adolescent interventions outside school physical education and sport

All studies included in this review have incorporated PAL in the school environment. However, the versatility of the PAL instructional strategy enables its application to many settings. For example, researchers focusing on healthy lifestyle interventions for children and adolescents, rather than skill development, should consider the outcomes of this review. The significant anthropometric, health and nutrition outcomes reported from these school-based interventions suggest that utilising similar methodologies that incorporate PAL in settings that are outside of school may be appropriate. Interestingly, all interventions reporting significant health-related outcomes involved cross-age tutoring; in contrast all changes to physical activity outcomes occurred using same-age tutoring. Although further insights regarding training protocols for PAL and dyad formation particularly relating to gender are required, the findings in this review may offer some direction for future interventions in settings other than schools. This will be particularly important as schools increasingly struggle to facilitate new initiatives with many competing curriculum demands and constraints.

2.7 Limitations

Several limitations in study designs were identified. The brief descriptions of some interventions greatly hampered the comprehension of how the intervention was implemented, the participant detail and consequently the components that were or were not effective. Overall, methodological limitations across the studies included; the lack of external validity, no random selection of groups, lack of control groups, short and or great variance in duration, no follow-up and mostly small sample sizes. Despite this, the unique physical education environment which often limits external validity, offers much in terms of the value

of the collective findings of these studies which were conducted in a variety of school contexts and used many variations of PAL. The nature of the type of publication and methodology limited some studies to only report qualitative trends with minimal statistical analysis and results should therefore be interpreted with caution (particularly in the absence of control groups). With eight studies involving fewer than 16 participants, the generalisation to other school contexts becomes difficult. Interventions were also included that provided opportunities for students with a disability within integrated or inclusive physical education or physical activity PAL contexts to work with a tutor so generalising the outcomes to a whole school population is not necessarily appropriate.

2.8 Conclusion

The range of studies with varying scope and quality precludes a definitive statement about the nature of the effectiveness of PAL in physical education, sport and physical activity interventions in schools. However, the need for well-designed interventions that meet the needs of participants by providing other benefits in addition to physical activity outcomes are required. Supporting previous reviews of physical activity opportunities and implementation in schools, this review highlights that PAL has the potential to provide students in schools with the capacity to make healthy lifestyle, motor skill and behavioural adaptations. However, the limitations and methodological differences make comparisons between studies extremely difficult.

Further research, particularly at secondary school level is needed to understand best practices when using PAL. Future studies should consider a robust methodology reflecting the need to adapt to different school climates or multiple school sites and quality measures of tutor training. What remains uncertain are ideal strategies to support these types of programs and the following components need to be strongly considered:

- The gender and age of tutors and tutees
- The flexibility of the curriculum to provide multi-component approaches or skill based outcomes over longer durations
- The specific model chosen to facilitate PAL
- The ideal tutor training process
- Measuring outcomes for both tutors and tutees including changes in leadership and education enhancing behaviours.

Peer-assisted learning may be conducive to promoting a positive and engaging learning environment for both the tutor and tutees. The impact that PAL has on a range of variables including cognitive, psychosocial and motor skill development has been well documented. However, more research is required to explore the use of many PAL structures that may enable teachers to facilitate greater improvements across the development of motor skills, physical activity, health and nutrition behaviours, knowledge and attitudes within the school physical education and health curriculum. Importantly, the adaptability of PAL across a range of settings provides scope for future research to assess its ability to impact on children and adolescents within a range of healthy lifestyle interventions both inside and outside the school environment.

CHAPTER 3

Physical education, sport and physical activity policies: Teacher knowledge and implementation in their Victorian state secondary school

CHAPTER THREE: Physical education, sport and physical activity policies: Teacher knowledge and implementation in their Victorian state secondary school

3.1 Preface

Prior to conducting a school-based intervention, it was essential to establish the current status of physical education in Victorian state secondary schools; the same school environment in which the intervention was to be implemented. A comparison to international education systems demonstrated similar trends and concerns relevant to the declining provision of physical activity opportunities in school via physical education, sport and extra-curricular programs. Following a critical review of the literature, it was identified that a greater understanding of the time allowances for physical and sport, and ascertaining if schools were meeting a range of physical education, sport and physical activity policies was imperative. Furthermore, this knowledge would inform the design of an intervention and where it would be best suited within the school environment. The following chapter is based on an article published in the peer-reviewed journal *European Physical Education Review* (Appendix A).

3.2 Introduction

The primary role of physical education (PE) is to provide education of the physical and through the physical, including opportunities to develop the affective, cognitive and psychomotor domains. It is important to understand the potential physical education also has to increase participation, health outcomes and lifelong learning, all of which continue to be current key Government policy agendas worldwide [108]. However, as Brooker and Clennett caution, public and societal health issues are complex and require more than just increases in physical activity in physical education classes to achieve changes in those at the greatest risk [12]. Hence, the role that physical education plays within schools across the world has come to the fore as it can now be seen as potentially assisting in providing a

resolution to the decreasing levels of physical activity in children and adolescents in a controlled and safe environment.

It is important to acknowledge that physical education is not the only avenue sought as the world attempts to respond to the global epidemic of childhood obesity in developed and developing countries [109]. The development of physical activity policies throughout the world is of paramount importance as they also encourage the promotion of activity for certain time periods, intensity and target specific populations [110-115]. Of those targeted populations, children and adolescents spend the majority of time at school and as a consequence many school-based sport, physical education and physical activity policies have evolved. Although physical education and school sport are closely related and provided within the school environment, they do not share the same goal or serve the same individuals and it is important to distinguish between the two. School sport provides opportunities for both competitive and non-competitive sport during co-curriculum time. This is not to be confused with the sport education pedagogical model, often implemented within physical education classes, with the intent of helping students become competent literate and enthusiastic sports persons [16]. In contrast, physical education is often concerned with developing student physical competence and confidence, and can develop the ability of students to perform in a range of activities [15]. Both are important in developing skills and attributes to encourage participation in physical activity both in and outside the school environment. More recently, physical activity policies have become apparent in many schools and are there to facilitate the promotion of activity and movement both inside and outside curriculum time. Many of these policies in schools are often guided and contested by Government and professional physical education associations in their corresponding countries [112, 116-120].

3.2.1 Secondary school physical education, sport and physical activity in an international context

Of the countries investigated within this study; Australia, Canada, England, New Zealand and the United States (USA), all have one of, both or multiple, physical activity, physical education or sport policies at a national, state or territory level which are required to be implemented in schools (Table 3.1). Within Australia there is currently no nationwide policy related to physical education, with individual states and territories having their own requirements. However, the Active Schools Curriculum policy which is nationally disseminated recommends all schools to deliver 120 minutes per week of physical activity [121]. Similarly, New Zealand's guidelines focus on physical activity and suggest 60 minutes per day based on the guidelines for sustainable physical activity in school communities [122]. In contrast to these national physical activity policies for schools, Canada, England and the USA have specific nationwide physical education policies. England requires 120 minutes per week of physical education and sport [123]. In Canada, the Quality Daily Physical Education program (QDPE) requires daily curricular instruction of 30 minutes per day across all year levels [124]. Similarly, at Elementary level in the USA, 150 minutes per week of physical education is recommended, increasing to 225 minutes per week of physical education for middle and high school students [117] (Table 3.1). Terminology defining year levels of schooling across the world is variable and Table 3.1 provides further clarification of comparative terms used.

3.2.2 Mandated secondary school physical education, sport and physical activity

In each of the countries compared (Table 3.1), physical education policy is more often than not delegated to state departments, local authorities or to individual schools, with some incorporating and taking into account Government or professional association national directives and some adopting their own policy. There are contrasting time periods given to specific physical education policies, ranging from 60-165 minutes per week across Canada

TABLE 3.1: International comparison of physical education, sport and physical activity policies

Country	Mins p/wk of PE/PA/Sp	What is to be provided in or outside curriculum	State/Territory	Mins p/wk of PE/PA/Sp	What is to be provided in or outside curriculum	PE provision across year levels.	Age (Years)
Australia	120 (#)	a	Australian Capital Territory[1]	100-150	c	K-10	4-15
			New South Wales[2]	120	c	K-10	4-15
			Northern Territory[3]	120	c	Pr-10	4-15
			Queensland [4]	120-150	b	Pr-10	4-15
			South Australia [5]	120	a	Pr-10	4-15
			Tasmania [6]	120	a	K-8	4-13
			Victoria [7]	100-200	c	Pr-10	4-15
			Western Australia [8]	120	b	Pr-10	4-15
Canada	150 (*)	b	Alberta [9]	150	c	E1-10	4-15
			British Columbia [9]	65-150	b	K-7	4-12
			Manitoba [9]	125	b	K-10	5-15
			New Brunswick [9]	100-150	c	K-9	4-14
			Newfoundland/Labrador [9]	90	c	K-9	4-15
			Nova Scotia [9]	100-150	c	K-9	4-15
			Ontario [9]	165	b	K-10	4-15
			Prince Ed Island [9]	60-108	c	1-9	4-15
			Quebec [9]	120	c	K-6	4-14
			Saskatchewan [9]	150	c	1-9	5-14
England	120 (#)[10]	c	N/A	N/A	c	R-10	4-14
New Zealand	300 (#)[11]	b	N/A	N/A	b	Y1-11	4-15
USA	E 150 (*) HS 225 (*)	c	Louisiana [12]	150	c	K-8	4-13
			New Jersey [12]	150	c	E1-12	5-17
			Montana [12]	225	c	K-8	4-13
			Indiana [12]	225	c	Not specified	N/A
			Montana [12]	225	c	K-8	4-13

			South Carolina [12]	225	c	E1-8	5-13
			District of Columbia [12]	225	c	K-10	4-15
			California[13]	E 100 HS 200	c	K-12	4-17
			Alabama, Alberta , Arkansas, Delaware, Louisiana, Maine, Maryland, Minnesota, Missouri, New Hampshire, New Mexico (K-9), North Carolina, Ohio, Tennessee, Utah, Vermont (K-9), Virginia (K-7), Washington, West Virginia, Wisconsin[12]	Not specified	c	K-8 HS not specified	4-13
			Illinois, Massachusetts, New Jersey, New York, Rhode Island, [12]	Not specified	c	K/1-12 only	4-17
			Arizona, Idaho, Mississippi, Nebraska[12]	Not specified	c	K-8 only No HS required	4-13
			Georgia, Hawaii, Kansas, Oklahoma, Pennsylvania[12]	Not specified	c	K-5/6 HS not specified	4-10/11
			Alaska, Florida, Indiana, Iowa, Kentucky, Nevada, Oregon, South Dakota, Texas[12]	Not specified	c	HS only	11-17
			Colorado, Connecticut, Michigan, North Dakota, Wyoming[12]	None	N/A	N/A	N/A

Note:(#) = policy directed by Government; (*) = policy provided by National physical education professional organisation; a=Provide physical activity only within or outside the curriculum; b= Provide physical activity and physical education within and outside the curriculum; c= Provide physical education and/or sport only within the curriculum; E= Elementary which is equivalent to Primary levels; K, Pr, R= first year at school in some States of Australia, Canada, England and the USA; N/A= Not applicable; P/A= Physical Activity; P/E= Physical Education; p/wk= per week; Sp= sport; Y= Year Level that students are participating in Physical Education; HS= High School refers to the upper levels of schooling, including junior, middle and senior High School in the USA and some States of Australia (Secondary level of education in Australia is equivalent to HS). [1]Australian Capital Territory Department of Education and Training (2007); [2] New South Wales Department of Education and Training (2006); [3]Northern Territory Government (2008); [4] Queensland Department of Education (2007b); [5] South Australian Department of Education and Children's Services (2006); [6] Tasmanian Department of Education (2009); Victorian Department of Education and Early Childhood Development, (2007); [8] Western Australian Department of Education and Training (2007); [9]The Canadian Association for Health, Physical Education, Recreation and Dance (2006); [10]Department for Education and Skills & Department of Culture, Media and Sport (2004); [11]Ministry of Education (2007); [12]National Association for Sport and Physical Education (2006); [13]San Diego State University (2007).

and between 100-200 minutes per week in Australia [18-21, 124, 125]. In New Zealand, although schools are required to provide physical education there is no specific physical education time provision in their policy. However, the accrued daily recommendation would result in a potential total of 300 minutes per week of physical education and physical activity [122]. England allows schools and head teachers to make individual school decisions with the expectation that they provide 120 minutes per week of physical education and sport for students [123]. In some states in the USA there is no requirement for the provision of physical education. In contrast, from 200 to 225 minutes per week may be offered in schools in the states of California, Indiana, Montana, South Carolina and the District of Columbia across various school year levels [126, 127]. In most instances, students in all of the fore mentioned countries are usually provided with physical education from the commencement of their schooling until the end of compulsory education (Table 3.1). Just as there is diversity in the amount of time allocated to physical education, countries have various combinations of physical education, sport, and physical activity that may be provided in schools both in and outside curriculum time (Table 3.1). Importantly, it should be noted that health education may also appear within some school physical education programs.

3.2.3 Are schools meeting mandates?

Internationally, it becomes increasingly difficult for some schools to follow policy and make valuable contributions to knowledge and physical activity when many countries do not even offer physical education within the curriculum. In 2008, Hardman reported that 21% of countries surveyed indicated that physical education was not being implemented in accordance with statutory obligations or expectations, or quite simply not at all [29]. Furthermore, it can also be observed that within those countries that were required to provide physical education, there were vast differences between official policy and the actual delivery of physical education [29]. This trend is also apparent in Australia, where despite such policies at national and local levels, studies indicate that students in Australia

are not meeting physical education mandates. Over two-thirds of secondary schools (67%) were not able to satisfy the South Australian mandate of 100 minutes per week [26]. Similarly, a Queensland review found that just under half of secondary students (41%) were not accessing adequate amounts of physical or sport each week in schools [27]. After the implementation of the Daily Physical Education Program in the late 1970's and 1980's in some states of Australia, it was found that no schools or teachers, no matter how enthusiastic or competent, had been able to fulfil the recommended time requirements of the program [24]. Furthermore, Turnbull suggests that generous estimates conclude that less than 10% of Australian government school children undertook daily physical education as part of the Daily Physical Education Program [25].

Likewise, in the USA where 78.3% of schools require some physical education, only 3.8% of elementary, 7.9% of middle school and 2.1% of high schools provide daily physical education for the entire year [128]. The USA Shape of the Nation Report (2006) reported that at middle school level, only one of the seven states that mandate physical education achieved the 225 minutes per week. Similarly only four of the 11 states that mandate physical education at high school also reached the target [126]. These results may have encouraged the recent reinforcement of the 50% MVPA guidelines for all physical education classes [129, 130]. In 2005, the Canadian Fitness and Lifestyle Research Institute found only 22% of Canadian children actually received daily physical education and 9% received no physical education at all [131]. A total of 29% of schools reportedly had no policy regarding physical education or physical activity in Canada [132]. In direct contrast to these countries, the recent 2007/08 survey of the National Physical Education, School Sport and Club links (PESSCL) strategy programme in England, showed that 78% of secondary schools were providing 120 minutes or more of physical education within curriculum time [133]. Schools participating in this programme receive direct funding should they achieve time and provision targets. Future targets are designed to encourage the provision of a total of three or more hours of physical education, sport and physical activity both within and outside curriculum time [133].

Regardless of numerous physical education, sport and physical activity policies internationally, this comparison highlights great variations between policy and implementation. This variance further emphasises the challenges teachers and schools face in delivering physical education to students of all ages and highlights the possible decreases in the opportunities available to children and adolescents in the school settings across the world.

3.2.4 Secondary school physical education, sport and physical activity in Victoria, Australia

In 2004, Australia introduced the National Physical Activity Guidelines to encourage increased activity in children and adolescents. Although these guidelines are not required to be implemented in or by schools, they are similar to many countries in that they suggest children and adolescents aged between 5-18 years of age access several hours a day of physical activity with at least 60 minutes a day of moderate to vigorous physical activity for health [110]. In contrast, unlike the National Physical Activity Guidelines, the Active Schools Curriculum policy, which is also disseminated from a national level, purposely targets schools and encourages them to provide 120 minutes per week of physical activity [121]. All Australian states and territories are responsible for their own education system and structure and therefore the provision of physical activity, sport and physical education policies. Specifically in the State of Victoria, the Department of Education and Early Childhood Development (DEECD) is responsible for the Physical Education and Sport policy [17]. This policy mandates the requirement of 100 minutes per week of physical education and 100 minutes per week of sport across compulsory levels of secondary school (Year 7-10)(Table 3.1). There is no published data in Victoria on whether schools are meeting this mandate or not. Therefore, the purpose of this study was to investigate specialist physical education teachers' awareness and knowledge of the policy and implementation of the mandate within their Victorian state secondary school. It was hypothesised that Victorian State secondary schools would not meet state mandates for physical education or sport.

3.3 Methods

3.3.1 Recruitment

A total of 271 schools were approached to partake in this study, with the questionnaire being made available to all physical education heads of department and specialist physical education teachers in 248 Victorian state secondary schools (Year 7-Year 12) and 23 Preparatory to Year 12 state schools (Prep-Year 12). Schools that did not provide a physical education program; a program across the mandated levels of physical education (Year 7-10); report on VELS [134] levels as required by the DEECD or could not provide a physical education program that did not require combining classes across multiple year levels were excluded from the study. A total of 24 state schools were excluded from the study.

Prior to data collection, the Victorian DEECD required that all eight regional education directors in Victoria were informed of the study and requirements of the schools participation within those regions. This was completed via fax or email. The database of schools contact information was established by viewing regional databases or individual school websites. Principals of each school were then informed via email of the online questionnaire and were asked to forward relevant details to the physical education heads of department. Physical education heads of department across the state were also individually emailed and they were asked to make their physical education staff aware and encourage completion of the questionnaire. After the initial four week recruitment period, further reminders were emailed to physical education heads of department and physical education teachers. Schools that had not responded to the questionnaire after four weeks were also mailed a letter in an attempt to enlist their participation. The collection period was for eight weeks in total.

3.3.2 Questionnaire

The online questionnaire was conducted between October and December 2008. Ethics approval was obtained from RMIT University and the Victorian DEECD, after which piloting of both printed and on-line questionnaires took place. After the questionnaire went live, a

trial period of one week enabled any difficulties associated with the format and completion of the online questionnaire to be assessed before the questionnaire was made available to schools. Minor adjustments were made to the layout and structure of the web pages with no changes made to the content.

Respondents were asked to comment on the provision of physical education within their school and demonstrate their understanding of state and national physical education, sport and physical activity policies and indicate how these were implemented in their school. As the questionnaire took approximately 20-30 minutes to complete, the format was designed for ease of completion. Questions included yes or no options, selection from lists of alternatives, numerical ranking of options and free text questions. When accessing the web page, respondents were introduced to the purpose of the study, approximate time required to complete, access to the Plain English Statement and that the respondent could remain anonymous should they choose to do so.

The questionnaire was divided into two; questionnaire A which was completed by physical education teachers (Section A-E) and questionnaire B completed by physical education heads of department (Section A-F). Only Section A, B and F of the questionnaire were used in this study and attempted to gain information relevant to; a) Demographic information of the teacher and school; b) Knowledge of physical education and physical activity policies in Australia and the state of Victoria and the provision of physical education and sport within their schools; f) Heads of physical education questions relevant to their responsibilities, curriculum content and school specific physical education issues. Upon completing each section, respondents were asked to include the last four digits of their six digit Victorian Institute of Teaching (VIT) registration number as a checking measure to ensure that all data submitted by respondents was gathered in one data file. Participants could include their school or personal email address if they chose to do so, however, not including this information did not exclude them from completing the questionnaire.

3.3.3 Data analysis

Analysis consisted of simple frequency statistics for all demographic variables including means, standard deviations and percentages. Cross tabs with Pearson's Chi-square analysis were used to investigate the associations between teacher knowledge of a range of policies and the age, years of teaching experience and the position of responsibility held by respondents. The association between different types of schools in terms of size and location (rural, remote or metropolitan) and their ability to meet the Victorian Physical Education and Sport mandate were also investigated using Cross tabs with Pearson's Chi-square. A p-value of <0.05 was accepted as statistically significant. To investigate the strength of these relationships, the standard residual was calculated with ± 1.96 defined as statistically significant. There were no missing data from Section A of the questionnaire (n=115). Missing data were excluded from the analysis in Section B, with 11 respondents not completing this section of the survey (n=104). Section F was completed by Physical Education heads of department only: of the total 48 physical education heads of department six respondents did not complete Section F (n=42). All data were analysed using Statistical Package for Social Sciences (SPSS for Windows, Version 17, SPSS Inc., Chicago, Il., USA).

3.4 Results

A total of 115 state secondary specialist physical education teachers responded to the online questionnaire (male=62, female=53). Of these, 48 respondents were physical education heads of department and the remaining 67 respondents were physical education teachers. The mean age range of teachers was between 31-35 years. A total of 32% of all teachers surveyed had 18 years or more teaching experience, 27% between less than six months and four years of experience, 22% between five and eight years of experience, with small numbers of teachers having between 9-12 years (9.5%) and 13-17 years (9.5%) of teaching experience. Of the teachers surveyed, 78% held leadership positions within the school as either physical education heads of department or in other leadership roles.

Respondents taught in schools that were defined by the Victorian DEECD as metropolitan (n=81), rural (n=29) or remote (n=5). There were 15 teachers who taught in schools with less than 200 students; in contrast a total of 48 teachers taught in schools that had student populations over 1001 students. Of the respondents, there were 111 teachers who taught in co-educational schools and four from female only schools. Of the 271 schools that were approached, responses were obtained from 54 different schools with the addition of 35 respondents who did not report which school they were from. There were multiple responses from some schools.

Specific questions were asked of the 48 physical education heads of department pertaining to their role. A total of 29% had only been in their current head of department position for between 6-12 months. In comparison, 26% of respondents had held the position of physical education head of department over their entire career for 11 or more years. Twenty-six of the physical education heads of department taught in metropolitan schools, 18 in rural schools and four from remote schools in Victoria. A third of heads of physical education taught in schools with over 1001 students, compared with 23% who taught in schools with less than 200 students.

3.4.1 Awareness and knowledge of policy and mandates

All physical education teachers were asked of their awareness and knowledge of the Australian National Physical Activity Guidelines, the Australian Active Schools Curriculum, and the Victorian Physical Education (100 minutes per week) and Sport policy (100 minutes per week) which is mandated across state secondary schools in Victoria (hereafter, referred to as the Victorian mandate). There was a greater awareness of the National Physical Activity Guidelines (84%) compared to the Active Schools Curriculum (58%) and Victorian mandate (64%)(Figure 3.1a). The actual specifics of the policy were not well known, with only 15% of respondents able to state the correct National Physical Activity Guidelines for

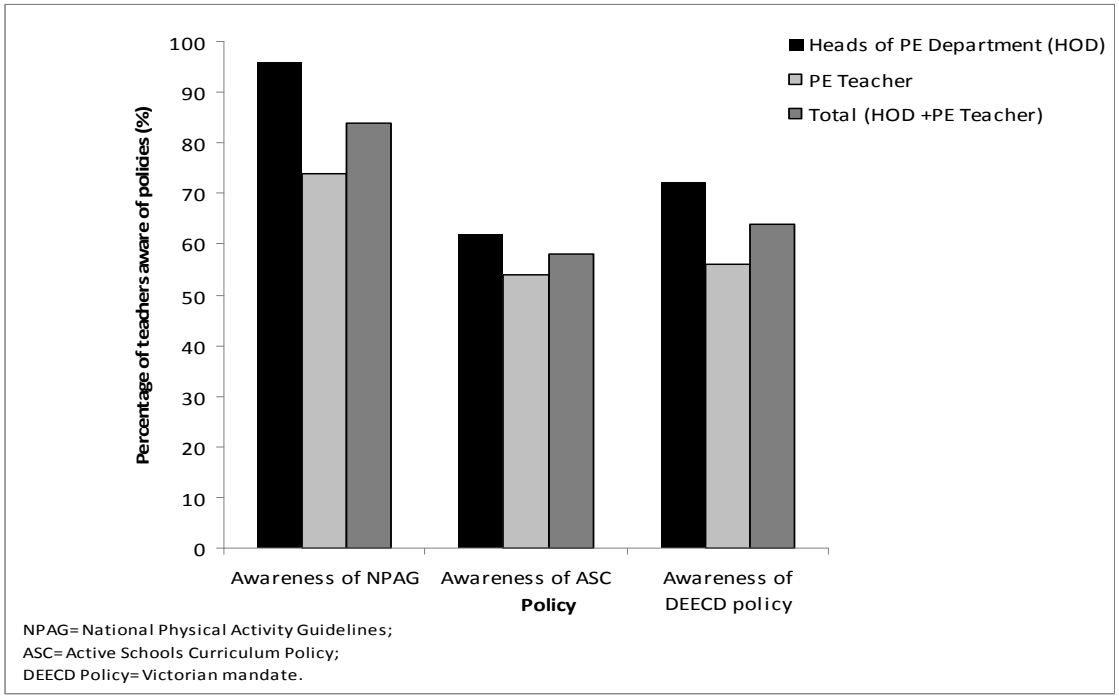


FIGURE 3.1a: Victorian state secondary school specialist physical education (PE) teachers' awareness of physical education, sport and physical activity policies

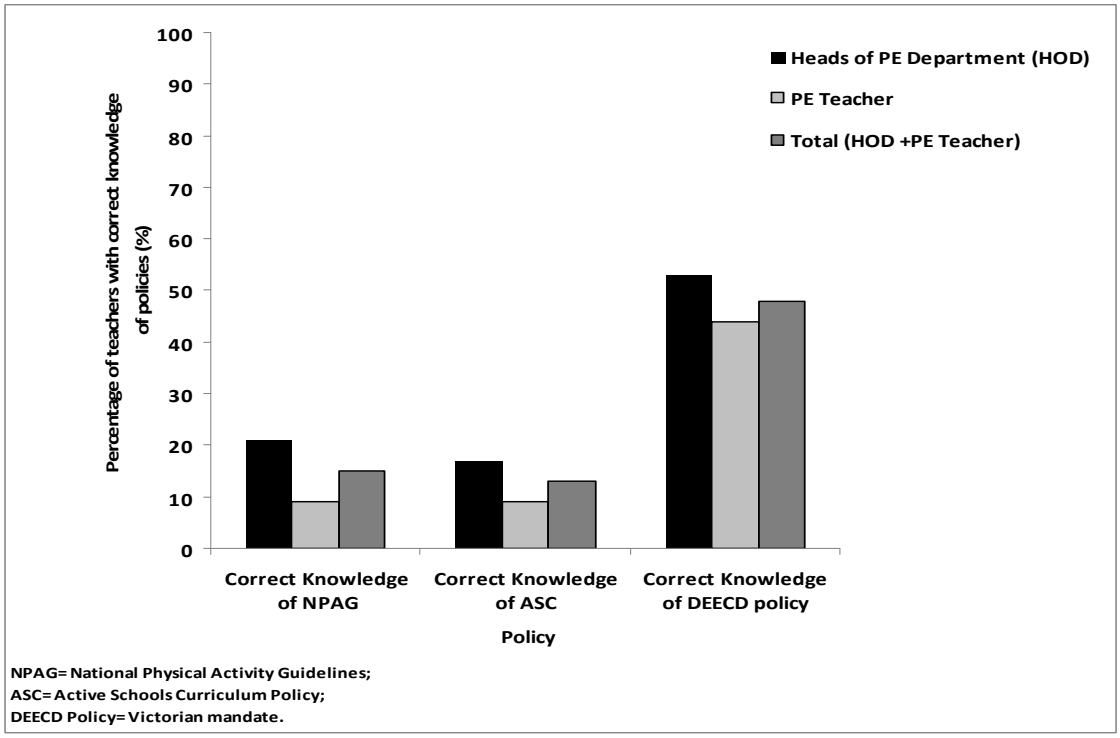


FIGURE 3.1b: Victorian state secondary school specialist physical education (PE) teachers' correct knowledge of physical education, sport and physical activity policies

adolescents (Figure 3.1b). In comparison, just under half of respondents (48%) demonstrated correct knowledge of the Victorian mandate (Figure 3.1b).

There were no significant associations between the position held by the teacher, either as physical education head of department or physical education teacher, and their correct knowledge of the Victorian mandate ($\chi^2(1)=0.899$, $p=0.343$) or the Active Schools Curriculum Policy ($\chi^2(1)=1.603$, $p=0.206$). However, there was a trend ($\chi^2(1)=3.263$, $p=0.071$) toward an association between correct knowledge of the National Physical Activity Guidelines and the position held by the teacher. Further analysis revealed that physical education heads of department had greater knowledge of these guidelines ($z= 1.2$) than physical education teachers (Figure 3.1b). Furthermore, the years of teaching experience had limited influence on the knowledge of each of the policies with no relationship evident between the years of teaching experience and knowledge of the Active Schools Curriculum policy ($\chi^2(2)=4.635$, $p=0.099$) or knowledge of the National Physical Activity Guidelines ($\chi^2(2)= 2.715$, $p=0.257$). In contrast, teaching experience was weakly associated with a greater correct knowledge of the Victorian mandate ($\chi^2 (2)= 5.515$, $p=0.063$), with teachers who had 18 years or more of teaching experience having a greater knowledge of the mandate ($z=1.4$).

3.4.2 Provision of physical education and sport within Victorian state secondary schools

Within their schools, 56% of physical education heads of department reported that physical education and sport were provided as separate subjects, with 44% of respondents' schools offering a combined physical and sport curriculum over various year levels (Figure 3.2). There is an obvious decline in the provision of physical education and sport as separate subjects as the Year level increases over the compulsory years of education. Conversely, there is an increase in physical education as a single subject being offered, indicating a loss of sport in preference to physical education, with increases in physical education apparent

from Year 7 (31%) to Year 10 (62%) (Figure 3.2). There were 45 physical education heads of department out of the 48 in total who taught in co-educational schools, with under half offering single sex classes at Year 7 (13%), Year 8 (21%), Year 9 (38%), and Year 10 (28%) in their school.

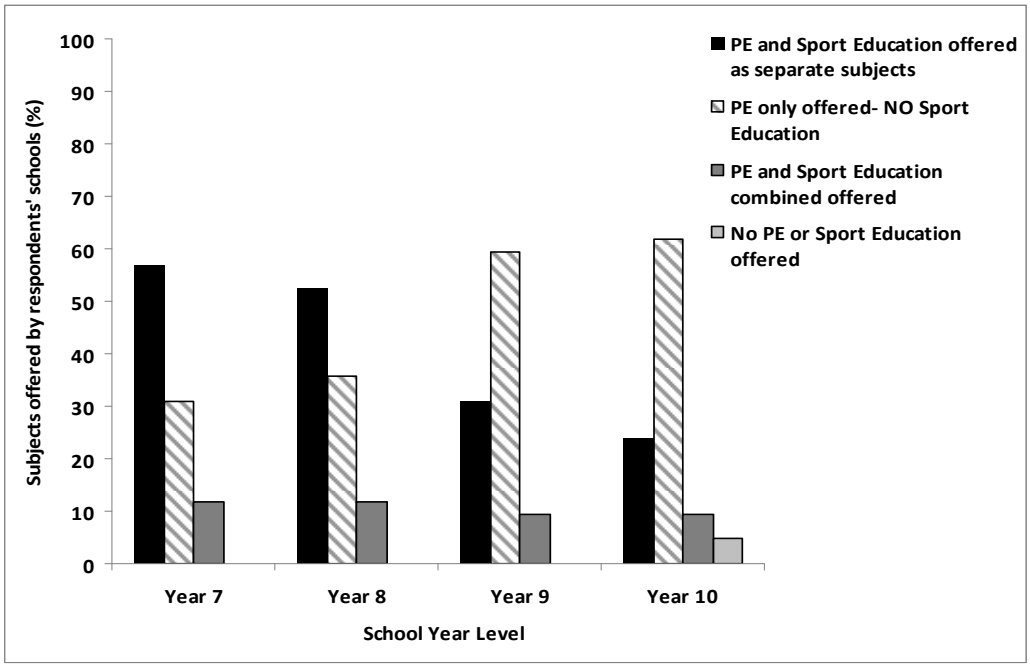


FIGURE 3.2: Comparison of Victorian state secondary school specialist physical education teachers reported provision of physical education (PE) and sport in their school

3.4.3 Implementation of the Victorian mandate in state secondary schools

In schools that provided physical education as a separate subject, there were a greater number of respondents that reported their school did not meet the 100 minute per week physical education mandate compared with those who reported their school provided 100 minutes or more of physical education per week (Figure 3.3a). This is similar in schools that provided combined physical education and sport, with only three respondents stating that they met the 200 minute mandate (when combined) across various Year levels.

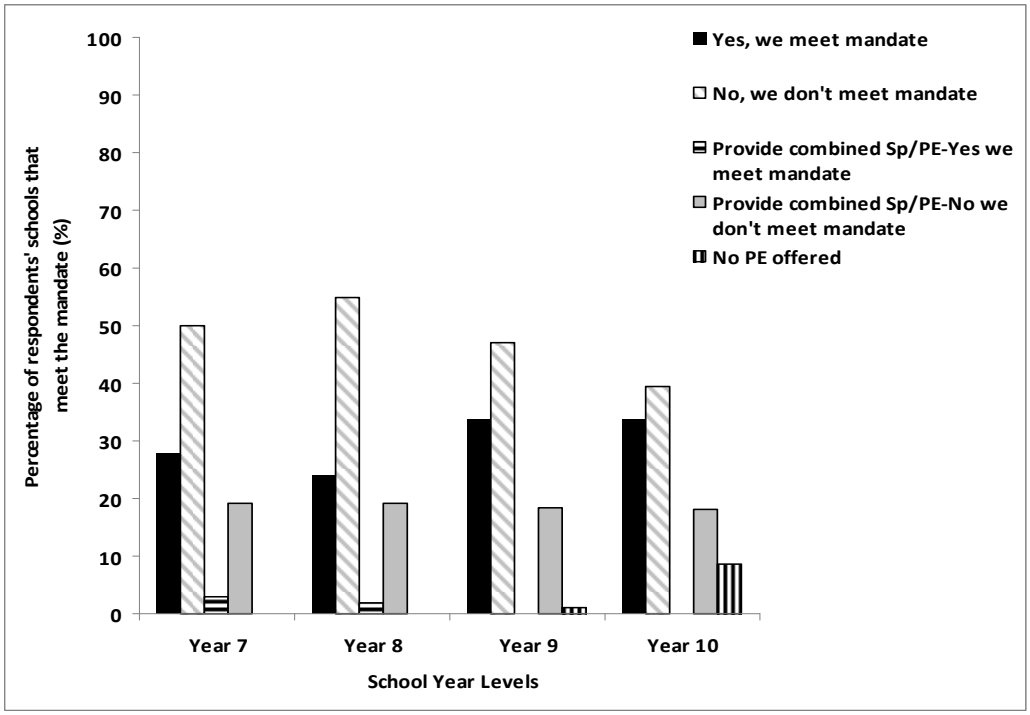


FIGURE 3.3a: Provision of physical education (PE) that meets the Victorian physical education 100 minute per week mandate across school year levels

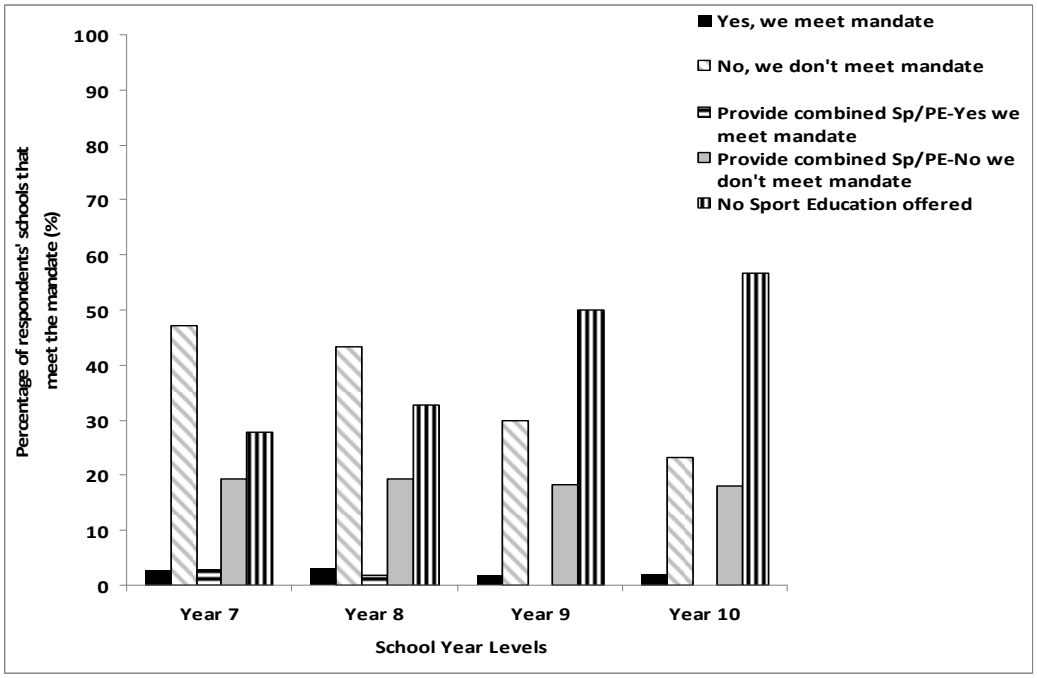


FIGURE 3.3b: Provision of sport (Sp) that meets the Victorian 100 minutes per week mandate across school year levels

It is also evident that at Year 9 and Year 10 some schools may not offer physical education to students at all. Similar trends are apparent across Year levels in relation to the provision of the 100 minutes per week of sport when it is offered as a separate subject (Figure 3.3b). The most noticeable difference between the provision of physical education and sport is the reduction in the amount of sport offered as Year levels increase from Year 7 to Year 10.

There was no association between the location of the school (metropolitan or rural/remote) and the ability of that school to specifically meet the Victorian 100 minutes per week physical education mandate across Year 7 ($\chi^2(1)=1.319$, p=0.251), Year 8 (χ^2 (1)=2.307, p=0.129) or Year 10 ($\chi^2(1)=2.971$, p=0.085). There was however, a significant association ($\chi^2(1)=5.658$, p=0.017) between the location of the school and the ability of the school to meet the physical education mandate at Year 9 level. Subsequent analysis revealed that rural and remote schools were less likely (z=-1.5) to meet the physical education mandate at Year 9. There is also a significant association between the size of the school (having ≤ 800 students or ≥ 801 students) and the ability of that school to meet the physical education mandate at Year 7 level ($\chi^2(1)=4.464$, p=0.035), Year 8 ($\chi^2(1)=4.976$, p=0.026), and Year 9 ($\chi^2(1)=4.246$, p=0.039). Additional analysis revealed that smaller schools (≤ 800 students) found it more difficult to meet the physical education mandate at Year 7 (z=-1.3), Year 8 (z=-1.5) and Year 9 (z=-1.2). There was no association between school size and meeting the physical education mandate at Year 10 level ($\chi^2(1)=1.382$, p=0.240).

A total of 32% of physical education heads of department reported they had no recognised procedure in place to measure the schools' compliance with the Victorian mandate. Furthermore, 14% stated they did not measure their compliance at all. Other physical education heads of department stated that they measured compliance by: referring to the timetable (21%), the Principal decides (24%), they completed appropriate forms (7%) and 2% were unsure of how the school measured its ability to meet the mandate.

3.5 Discussion

Physical education, sport and physical activity policies for schools are often underpinned by some common objectives; to get children and adolescents active and to provide an education to develop fundamental skills to enable lifelong health and activity choices to be made. However, as reported by Hardman, the discrepancies between actual implementation and written physical education policy suggest many inconsistencies [29]. The comparative results reported here in Table 3.1 draw attention to the world-wide differences in the provision of physical education; the time variations with offerings as little as 65 minutes per week to 300 minutes per week and vastly different policy and curriculum content with physical education, physical activity and sport being provided in various combinations. However, the importance of these findings lies not in the fact that there are large differences in policy across the world as Governments and even schools themselves grapple with increasing pressure to activate communities, but with the knowledge that there appears to be limited accountability of the many policies; the majority of which are accountable only by means of self-reported data. The "....failure to strictly apply legislation on school PE provision…"(p.23) [29] is not only apparent across the world, but also in Victoria, Australia where 46% of physical education heads of department from this study reported that they had no procedure in place or did not measure their compliance to the Victorian mandate. This demonstrates a disparity between mandated policy and its implementation, and highlights that although policy and mandates can be put forward in Victorian secondary schools, compliance appears to be influenced by many external factors, including lack of accountability. Similarly, the recent Crawford Report [14] highlights that "no measurement of delivery"(p.27) is apparent across all of Australia and that decisions regarding physical education and physical activity are largely left to schools and teachers.

3.5.1 Awareness and knowledge of policy and mandates

Both the 1992 Senate Inquiry [4] and the Victorian based Moneghetti Report [135] highlight the crowded curriculum in schools as one component that was stifling the progress of and

participation in physical education. Recommendations from the Moneghetti Report led to the development of the Victorian Physical Education and Sport policy. The awareness and knowledge of such policy can give teachers and heads of department power to ensure decisions regarding curriculum and teaching and learning spaces are equitable. Despite the importance of acquiring this information, only 48% of teachers surveyed demonstrated the correct knowledge of the Victorian mandate, with 72% of Physical Education heads of department and 56% of physical education teachers reporting that they were at least aware of the mandate. There was a weak association between years of teaching experience and the correct knowledge of the mandate. The Victorian mandate was first developed in 1993 and was heavily promoted and required to be implemented in state schools by the end of 1995, therefore those with greater years of teaching experience may be more familiar with the policy. Interestingly, there was a greater awareness of the National Physical Activity Guidelines across all respondents (84%) than the Victorian mandate (64%). In an attempt to increase activity and decrease associated health risks, upon release the Federal Government campaigned strongly with persistent advertising and encouraged the inclusion of these guidelines in many state curricula and classrooms. Consequently, this may have been responsible for the greater awareness of the National Physical Activity Guidelines reported in this study and confirms the notion put forward by Bellew and colleagues [136] that stronger political support may just be one of the solutions to increasing participation and awareness of activity policies within our communities. Results from this study further encourage proactive professional development from professional associations as nearly a quarter of Physical Education heads of department gained their knowledge of the Victorian mandate from ACHPER. The role of teacher training in Universities can also be considered influential in disseminating knowledge of the Active Schools Curriculum policy and the National Physical Activity Guidelines and should be responsible for keeping students abreast of developments as Australia enters a new phase of developing a national curriculum.

3.5.2 Implementation of physical education and sport policy in Victorian state secondary schools

In total, only a third of respondents reported that their school provided at least 100 minutes per week of physical education at Years 9 and 10. More concerning are the results at Year 7 (28%) and Year 8 (23%), an age where lifelong activity patterns are established, where it was evident that fewer respondents' schools were providing 100 minutes per week of physical education. Data from this study demonstrates that there are a greater number of schools not meeting the physical education mandate than are compliant. Similarly, this is reflected in schools' ability to meet the sport mandate with only 3% of respondent's schools at Year 7 and 8, and 2% at Year 9 and 10 reported meeting the sport mandate. Schools that combined physical education and sport together also reported similar results. Ultimately, it demonstrates that schools are having difficulty providing opportunities for the combined total of 200 minutes of physical education and sport. Further research is warranted to understand the barriers impeding the provision of physical education and sport that meets the Victorian mandate as it is paramount to the future of quality physical education in Victorian secondary schools. This pattern of non-compliance has not changed from and is consistent with trends observed in other parts of Australia [26, 27, 137]. Whether it be physical education non-compliance (66-77% across Year levels; Fig 3.3a) or sport non-compliance (97-98% across Year levels; Fig 3.3b), a large number of Victorian secondary schools are not meeting the mandate, therefore opportunities to be active for the recommended duration of time are not being made available to students.

There is some evidence in Australia to suggest that policies mandating compulsory school physical education and sport may not be sufficient to increase physical activity and fitness [138]. In this study, this is reinforced by the fact that policy, although written and mandated, is not being implemented by a large number of schools. Therefore potentially students are not provided with opportunities to increase activity and possibly achieve the many goals of physical education which are dependent on personal preferences and rationales [139].

However, by simply offering physical education opportunities it may not engage, excite or encourage participation and may in fact alienate students [140]. In summary, providing opportunities for physical education, sport and physical activity does not necessarily equate to schools and students meeting mandated requirements.

The significant relationship between the size of the school and the ability of that school to meet the physical education mandate at Year 7, 8 and 9 may be explained by smaller schools having less funding and therefore potentially access to fewer facilities, equipment or staff and therefore less flexibility which could result in school-based decisions on curriculum that decrease time provisions for physical education. Anecdotal evidence also suggests that schools are often endeavouring at Year 9 level to provide a large range of elective based options to stimulate students and this can sometimes be to the detriment of compulsory physical education or sport. Although frequently there are options related to physical education made available, such as outdoor education and human movement, these were not considered in this study as they often involve different curriculum content and objectives. The significant association between rural and remote schools at Year 9 level being less likely to meet the physical education mandate could possibly be attributed to many rural and remote schools offering trade and training based programmes for students at Year 9 and Year 10, however, this would need further investigation to fully elucidate. The offering of these subjects are suited to their student populations and also attempt to bolster potential employment opportunities within the community.

The difference between a schools' ability to meet physical education in preference to the sport mandate is of considerable interest. Research suggests that a strong foundation in fundamental movement skills will result in participants being more active, both during childhood and adulthood [15]. To assist this strong foundation and development, the Victorian Physical Education and Sport policy highlights that students should have access to both physical and sport until the end of compulsory schooling. In direct contrast to these

objectives, the results from this study indicate a steady decline in the provision of physical education and sport (as separate subjects) as students' increase in age and Year level (Fig 3.2). At Year 7 level, 49% of respondents' schools offered separate physical education and sport in comparison to Year 10 where only 23% of respondents' schools did so. Conversely, there is an increase in physical education as a single subject being offered as the Year level increases, with no sport being provided which therefore makes meeting the sport mandate unattainable. As schools make decisions regarding curriculum content, the debate then turns to which is most important to the student? Schools will wrestle with providing sport or physical education which potentially provides the opportunity for students to obtain the knowledge and skills needed to establish and maintain physically active lifestyles [128]. The data from this study indicates that schools in Victoria when asked to decide between the two subjects are providing physical education in preference to sport, particularly in the later years of compulsory schooling.

There is an increasing amount of published trend data available in Australia on children's participation in physical activity, school physical education and sport [141-143]. There were 271 schools available to access for this study, of which data was received from 54 known schools with the addition of 35 respondents who did not report which school they were from. Schools from metropolitan, rural and remote areas are well represented, as well as varied school sizes; schools with less than 200 students to schools with over 1001 students. The range of experience that teachers have is vast, with beginning teachers, moderate levels of experience and those with over 18 years of experience all completing the questionnaire. The assumption that all schools had access to the internet was made by researchers and that each school's email mailbox was cleared daily and directed to those appropriate within the title of the email. This chain of communication may have been hampered by technology or failure of someone to pass on information. A potential limitation of the current study is that self-reported data was obtained and therefore teachers may not have accurately represented the physical education and sport programmes delivered within their school.

However, although mandates are in place, there are no procedures that independently assess compliance necessitating the reliance on self-reported data.

3.6 Conclusion

This study in Victoria, Australia, further supports findings that reported the majority of physical education and school-based physical activity policies in place around the world are unable to be achieved, monitored or held accountable [29]. Specifically, this study gives a unique insight into what is actually occurring in Victorian state secondary schools and supports the hypothesis that schools would not meet state mandates for physical education or sport. The reported compliance of respondent's schools to the physical education and sport mandate is low across compulsory levels of schooling, in both physical education (between 23-33%) and sport (between 2-3%). The reduction of sport in preference to providing physical education is of great interest, emphasising the challenge of disseminating policy and consequently the impact of this on its implementation in schools. It also highlights the concerning trend of reducing physical education and activity opportunities in schools and raises the decade old question of whether students if given the opportunities can actually be engaged, encouraged and excited by physical education.

Further research is warranted to understand the barriers specific to the provision and participation in physical and sport in Victorian state secondary schools. Equipped with this information, it may provide opportunities to stimulate the school environment and physical education curriculum to offer more opportunities for physical education, sport and physical activity pursuits in and outside curriculum time.

CHAPTER 4

Barriers to providing physical education and physical activity in Victorian state secondary schools

CHAPTER FOUR: Barriers to providing physical education and physical activity in Victorian state secondary schools

4.1 Preface

After establishing the current status of physical education provision in Victoria, Australia, the issues surrounding the inability of teachers to implement physical education and sport in their school were considered. Given that schools and teachers do not have the capacity to meet mandated time requirements when delivering the physical education curriculum in Victorian state secondary schools, the implementation of a physical activity initiative into the school environment would need further consideration. Therefore, understanding the barriers and enablers to their provision of physical education was necessary to highlight any potential obstacles to the success of a physical activity intervention. The following chapter is based on an article published in the peer-reviewed journal *Australian Journal of Teacher Education* (Appendix A).

4.2 Introduction

With exercise and activity habits commencing early in life and the development of healthy lifestyle behaviours among children and adolescents translating into reduced health risks in adulthood [75], quality education at an early age is paramount. Hence, schools have been identified as key health settings and are being called upon to give greater attention to their physical education and physical activity programs [76, 77]. Schools have the capacity to equip students with these attributes; however, it is the quality of the physical education programs in schools that will ensure that young people are given the opportunities to become physically-educated individuals [128].Physical educators are also becoming more accountable as their role continues to evolve and they pursue opportunities to facilitate activities that engage students and provide education on lifestyle choices and healthy behaviours

Quality physical education is not a universal term and as such Penney, Brooker, Hay and Gillespie (2009) state that “interests in and conceptualisations of quality vary across educational arenas and beyond, and furthermore, that understandings of quality are destined to be framed in relation to dominant policy and political discourses” (pg. 423)[144]. In this study, quality physical education was determined by each teacher’s own beliefs and values. The provision of quality physical education can be affected by many other factors, some of which can assist or hinder delivery and participation including: national and local culture, school organisation, timetable arrangements, professional learning opportunities, school demographics, human and physical resources [144].

4.2.1 Institutional and teacher-related barriers to physical education provision

Barriers within schools that restrict teachers providing quality physical education programs to their students have been previously classified as being either *institutional* (outside the teachers’ control) or *teacher-related* (arising from the teachers’ behaviour) [28]. The simplicity of this classification enables it to be applied to both primary and secondary school settings.

Previous research has highlighted many *institutional* barriers including budget constraints, scarce resources, reductions in time provisions in the curriculum, the absence of professional development, the crowded curriculum itself and the lack of facilities and equipment [4, 28-30]. Similarly, Canadian research has reported that the lower priority given to physical education, the absence of performance measures for physical education and activity, and insufficient infrastructure were the three major *institutional* barriers identified by generalist elementary teachers to the provision of a curriculum that was capable of meeting the health and physical education guidelines [31].

Most *teacher-related* barriers have been reported in primary school studies [28, 31, 32, 35]. The barriers described include possessing low levels of confidence or interest in teaching

physical education, being unable to provide safely planned and structured lessons, having had personal negative experiences in physical education and lacking training, knowledge, expertise and qualifications to provide physical education [33-35].

The comprehensive primary school-based findings reflect not only the lack of research across the secondary levels in schools, but could possibly be attributed to both secondary and specialist primary school teachers having dedicated physical education units as part of their training. This specialisation should equip teachers with the skills to overcome barriers more easily and enable them to plan and implement programs accordingly. A summary of *institutional* and *teacher-related* barriers to physical education and physical activity that compares primary and secondary school environments can be found in Table 4.1.

4.2.2 Student-related barriers to participation in physical education and physical activity

In contrast to the barriers experienced by generalist teachers, a recent study from the United Kingdom investigated heads of physical education and heads of schools' perceptions of barriers to providing physical education and physical activity in secondary school environments [36]. Despite reporting some *institutional* and *teacher-related* barriers similar to those found in the primary school studies, this study also found that teachers perceived that students were lured by the greater availability of sedentary opportunities and consequently suggested that lower levels of fitness and lower physical ability in students might be impacting on both delivery and participation in physical education and physical activity [36]. Therefore, further consideration of other barriers in secondary schools that inhibit the delivery of and students' participation in physical education is warranted; *student-related* barriers are further obstacles that teachers must be able to plan for and overcome when providing educational opportunities for students.

TABLE 4.1: Barriers to the delivery of physical education (PE) and physical activity (PA) programs to primary and secondary school students

Barrier	Primary Schools	Secondary Schools
Institutional	Access to and lack of facilities [1, 7] Lack of time [1, 7] Crowded curriculum [7] Funding [1, 7] Access to and lack of equipment [1] Support from other staff [1] Support from administration [1, 7] Access to professional development [7] PE/Sport not priorities in school [1, 5] Large class sizes [1, 7] Budget constraints [7] Insufficient infrastructure [5] Other teaching priorities [1, 5] Quality of facilities [1] Level of professional development [7] School executive attitudes toward PE [1] Insufficient number of PE staff [1, 5] Lack of performance measures for PE [5]	Access to and lack of facilities [6] Lack of time [2] Restricted curriculum [2] Funding [6] Ethos of PA for life within the school [2] Socioeconomic status of school [3] Timetabling [6]
Teacher-related	Lack of training and knowledge [4] Difficulty of providing safely planned and structured lessons [4] Gender stereotyping of activities [4] Poor planning [4] Perceptions of the value of PE [4] High level of accountability for other subjects [5] Confidence in teaching PE [7, 8, 12] Interest in/enthusiasm for PE [7] Personal school experiences in PE [7, 8] Attitudes toward PE [5] Expertise/qualifications [7, 8, 12]	Colleagues undervaluing activities [2] Ethos of performance/élitism of PE department or school as a whole [2]
Student-related	Lack of student engagement [9] Expressed dislike for activity [9] Lack of intrinsic and extrinsic motivation [9] Intrapersonal barriers [11]	Student engagement [6] Lure of sedentary behaviour [2] Low fitness levels therefore potentially lower ability [2] Socioeconomic status of student [3] Levels of encouragement and motivation [3] Peer support [3,10] Peer pressure [10] Intrapersonal barriers [11] Lack of motivation/laziness [11]

Note: PA = physical activity; PE = physical education; Sport = sport. [1] Barroso, McCullum-Gomez, Hoelscher, Kelder, & Murray (2005); [2] Boyle, Jones, & Walters (2008); [3]Dagkas & Stathi (2007); [4] DeCorby, Halas, Dixon, Wintrup, & Janzen (2005); [5]Dwyer et al., (2003); [6]Dwyer et al., (2006); [7]Morgan & Hansen (2008); [8]Morgan & Bourke (2005); [9]Mowling, Brock, Eiler & Rudisill (2004);[10]Salvy et al., (2009);[11]Sherar, Gyurcsik, Humbert, Dyck, Fowler-Kerry & Baxter-Jones (2009);[12]Xiang, Lowry, & McBride (2002).

Previous research on children's and adolescents' self-reported barriers to participation in physical education and physical activity has reported changing attitudes to activity and physical education, adolescents' decision making favouring more sedentary activities, the importance of peer pressure or desire for peer approval when choosing activities, the changing fitness levels of students, student unwillingness to participate, a dislike of activity, a lack of understanding of the benefits of physical activity and a decline in student interest [4, 36, 145-147].

The barriers that exist for student learning and participation may in part be explained by the Social Cognitive Theory [43] which highlights the relationship between cognitive, behavioural and environmental factors that influence an individual's choices, including those relating to physical activity behaviour. These three factors are not independent, but are mutually dependent and all influence learning and activity choices within a host of contexts. Due to the large amount of time dedicated to schooling, students are influenced greatly within the school environment by many elements, including their teachers, their peers, the programs provided, their participation in classes and their engagement in curriculum and extra or co-curricular activities. The interaction and influence of all three factors on preferred behaviour is certainly most evident at the secondary school level, where adolescents begin to cement their own attitudes and beliefs regarding physical activity. A summary of *student-related* barriers is included in Table 4.1.

The benefits of participation in physical education are numerous and have been categorised as being physical, lifestyle, affective, social, and cognitive [78]. However, it becomes increasingly difficult to provide appropriate physical education and physical activity opportunities in schools when constrained by many *institutional, teacher-* and *student-related* barriers.

The majority of previous research has focused on primary schools therefore, it is important to understand the barriers to physical education and physical activity provisions in

secondary schools more clearly. The limitations identified by teachers responsible for providing school-based opportunities need to be examined, as an understanding of these barriers is essential to making improvements and developing quality physical education programs in secondary schools, both now and into the future.

The purpose of this study was:

(i) to investigate the barriers experienced by physical education teachers that influence their provision of school-based physical education and physical activity in Victorian state secondary schools;

(ii) to determine the teachers' perceptions of barriers that students experience in accessing physical education and physical activity opportunities in their schools. It was hypothesised that physical education teacher's would perceive that *institutional* barriers were the primary influence on physical education and physical activity participation by their students in Victorian state secondary schools.

4.3 Method

4.3.1 Recruitment

Some 270 state secondary schools (Year 7-Year 12) and preparatory to Year 12 state schools were considered as potentially providing participants for the study. Thirty-eight schools that did not:

- provide physical education programs;
- provide programs across the Victorian mandated levels of physical education (Year 7- Year 10);
- report on VELS (Victorian Curriculum and Assessment Authority, 2008) levels as required by the Victorian Department of Education and Early Childhood Development (DEECD); or

- provide physical education programs that did not require combining classes across multiple year levels,

were excluded, resulting in 233 schools being contacted and invited to take part in the study.

Schools representative of metropolitan, rural and remote demographic areas as defined by the DEECD were included. Prior to the data collection, the DEECD required that all eight regional education directors be informed of the study, and this was sent by fax or email. The database of schools' contact information was established by viewing regional databases or individual schools' websites. Principals of each school were then informed via email of the on-line questionnaire and were asked to forward relevant details to the physical education heads of department. These heads of department were also individually emailed and were asked to make their physical education staff aware of the questionnaire and encourage them to complete it.

After the initial four-week recruitment period, further reminders were emailed to all physical education heads of department and physical education teachers. Schools that had not responded to the questionnaire after four weeks were also mailed letters in an attempt to enlist their participation. The collection period totalled eight weeks.

4.3.2 Questionnaire

The on-line questionnaire was administered between October and December 2008. Ethics approval was obtained from RMIT University and the DEECD. Piloting of first a printed questionnaire and then the on-line version of the same questionnaire was undertaken to enable any difficulties associated with the format and instructions to be assessed before it was made available to schools. Minor adjustments were made to the layout and structure of the web pages, but no changes were made to the content.

Teachers could complete the questionnaire at their convenience, although internet access was required. The links to the questionnaire, which took approximately 20-30 minutes to complete, were provided in the initial email contact with Principals. The format was designed for ease of completion: it included 'yes' or 'no' responses, list selections with 'other' options available, numerical rankings and limited free text responses. When accessing the web page, respondents were introduced to the purpose of the study, the approximate time required to complete it, access to the Plain English Statement and an assurance that they could remain anonymous should they choose to do so.

Specifically, the questionnaire attempted to gain information relevant to the individual teachers' positions and school demographic information, including size, location, structure, number of staff and priority areas. Teachers were asked to rate the facilities and equipment; the school culture and how physical education was positioned within the school context; and how they thought physical education was perceived by the whole school community, other staff and the management or leadership team.

Participants were asked to rank the most ('10') to least ('1') influential factors that influenced their quality of teaching and the five most significant barriers that they perceived restricted their students from being active inside the school from most ('5') to least ('1') significant. Finally, teachers were asked how they perceived fitness levels of students across all secondary Year levels (Year 7 to senior school). Options included rating students' fitness levels as poor, below average, average, above average or high.

Upon completion, participants were asked to include the last four digits of their six- digit Victorian Institute of Teaching (VIT) registration numbers as a checking measure to ensure all data submitted by respondents were gathered in one data file. Respondents could include their school or personal email addresses, but not including this information did not exclude them from the study or prevent them from completing the questionnaire.

4.3.3 Data analysis

Analysis consisted of frequency statistics including means, standard deviations and percentages for all demographic variables, the barriers experienced by physical education teachers as well as those perceived by teachers to be experienced by students inside the school environment.

Cross tabs with Pearson's Chi-square analysis were used to investigate the associations between gender, school size, school location (rural/remote or metropolitan) and the perceived level of respect for the subject of physical education by the school management or leadership team, other colleagues and the whole school community. Perceived fitness levels of students were compared across Years 7 and 8 (n=92, n=92), Year 9 (n=93) and Year 10 (n=91) by location and size of school.

To investigate the strength of these relationships, the standard residual was calculated, with ±1.96 defined as being statistically significant. A p-value of <0.05 was accepted as being statistically significant. Furthermore, ratings of facilities and equipment were also analysed, using Pearson's Chi-square in an attempt to establish any relationships between teachers' gender, years of teaching experience, school location, school size or position of responsibility held.

There were no missing data from the demographic section of the questionnaire (n=115). Some ranking data sets were incomplete and were therefore excluded from analysis for that aspect. Complete data sets were available from teachers ranking their own barriers from '10' to '1' (n=70) and ranking from '5' to '1' perceived barriers for students inside their schools (n=73). All data were analysed using Statistical Package for Social Sciences (SPSS for Windows, Version 17).

4.4 Results

The questionnaire was responded to by 115 state secondary school specialist physical education teachers (male=62, female=53). Of the 233 schools that employed potential participants, responses were obtained from 54 schools, while 35 respondents did not report which school they were from. There were multiple responses from some schools. The mean age range of teachers who responded was 31-35 years. In total, 67 respondents were physical education teachers and the remaining 48 held physical education heads of department positions.

Of the teachers surveyed, 78% held leadership positions as either physical education heads of department or in other leadership roles. Of all teachers surveyed, 32% had 18 years or more of teaching experience, 27% had between less than six months and four years' experience, 22% had between five and eight years' experience, and small numbers had between 9 and 12 years (9.5%) and 13 and 17 years (9.5%) of teaching experience.

There were 41% of teachers who taught in schools that had student populations of over 1001; in contrast, 13% cent of teachers taught in schools with fewer than 200 students. Four respondents were from girls-only schools and the other 111 taught in co-educational schools. Eighty-one respondents taught in schools that were defined as metropolitan, 29 in rural schools and five in remote schools.

Teachers reported a perceived trend of increasingly 'poor' levels of fitness (3-9% from Year 7 to Year 10) and 'below-average' levels of fitness (21-34% from Year 7 to Year 10), indicating that as students get older their level of fitness is perceived to decline. There was a significant association between the location of the school (metropolitan or rural/remote) and the perceived level of fitness at Years 9 (χ^2 (2)=6.295, p=0.043) and 10 (χ^2 (2)=8.679, p=0.013). Analysis of the standardised residuals revealed that students in Year 9 (z=-1.6)

and Year 10 (z=-1.8) who attended rural or remote schools were more likely than students in metropolitan schools to be perceived as having 'below-average' fitness levels.

There was a significant association between perceived level of fitness and school size at Year 9 (χ^2 (2)=11.894, p=0.003) and Year 10 (χ^2 (2)=8.318, p=0.016), with no associations noted at Year 7 (χ^2 (2)=0.754, p=0.686), or Year 8 (χ^2 (2)=2.290, p=0.318). The standardised residuals show that students were more likely to be perceived as having 'below-average' levels of fitness in schools with fewer than 800 students in Years 9 (z=-2.1) and 10 (z=-1.6) than in larger schools.

4.4.1 Physical education teachers' perceptions of the status of physical education in their schools

When respondents were asked what their schools' teaching priority areas were, 42% reported that all subjects had equal priority and a further 27% believed that their schools focused on the academic success of their students. A variety of other priority areas were reported by teachers, including English (9%), Information Technology (8%), Mathematics (4%), Literacy and Numeracy (3%), Music (2%) and Arts (2%). By contrast, only three per cent of respondents reported that physical education and school sport were the main priority within their school.

Despite most respondents' schools not having physical education as a priority, nearly half (45%) reported that they would rate physical education as being 'extremely' or 'very' important in the whole school community. There were no significant associations between school size (having ≤ 800 students or ≥ 801 students) and how important physical education was perceived by the whole school community (χ^2 (2)= 0.235, p=0.889) or how respected teachers perceived physical education to be considered by the management or leadership team within the school ($\chi^2(2)=3.248$, p=0.197) (Figure 4.1).

However, there was a trend toward a significant association between school size and the perceived level of respect for physical education by other colleagues (χ^2 (2)=9.785, p=0.008). There was also an association between the location of the school (metropolitan or rural/remote) and the perceived level of respect for physical education by other colleagues (χ^2 (2)=7.347, p=0.025). Subsequent analysis revealed that teachers in rural and remote schools were more likely(z=-1.7) to report that their colleagues perceived physical education as only 'somewhat' respected or 'not at all' respected. A significant relationship between the gender of the teachers and their perception of how physical education was viewed by the management or leadership team in the school (χ^2 (2)=7.192, p=0.027) was found. The association was most apparent between females and their perceptions that physical education was 'well' respected or 'very well' respected by those in management or leadership positions (z=1.7). There was no relationship between gender and how physical education was perceived to be regarded by the school community or by other colleagues.

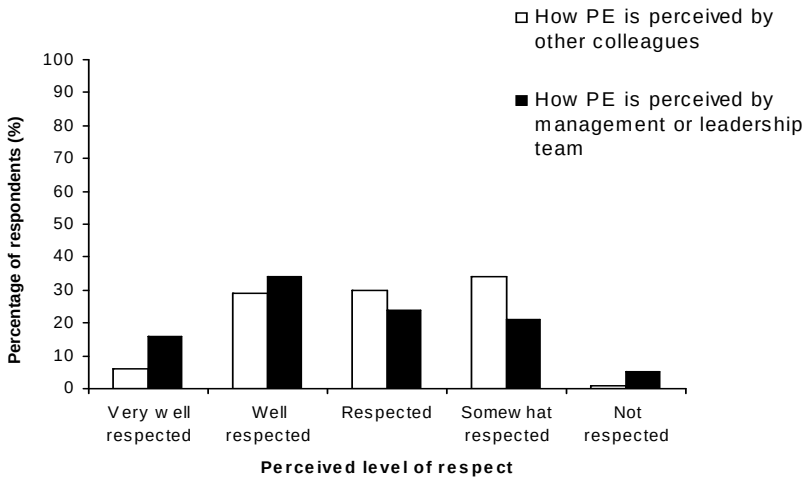


FIGURE 4.1: Victorian state secondary school physical education teachers' perceived level of respect for physical education in schools by other colleagues and the management or leadership team

4.4.2 Barriers to the delivery of physical education in state secondary schools in Victoria

Teachers ranked from most ('10') to least influential ('1') the barriers to their delivery of quality physical education programs. The accessibility of facilities $\bar{x}$=8.10 (2.3) was ranked the greatest barrier to their provision of physical education, with access to professional development perceived as the least influential $\bar{x}$=3.17(2.19) (Table 4.2).

TABLE 4.2: Physical education teachers' ranking of barriers to providing quality physical education (PE) in Victorian state secondary schools

Barriers to providing quality physical education (n=70)	Rank order most ('10') to least ('1') important	Mean	SD	Barrier category
Access to facilities	10	8.10	2.30	I
Access to suitable teaching spaces	9	7.95	2.15	I
Access to equipment	8	7.37	2.10	I
Timetabling	7	6.17	2.50	I
Support from other staff	6	5.15	2.56	I
Funding for the subject	5	4.74	2.43	I
Support from management and administration	4	4.17	2.30	I
Leadership from heads of department	3	4.15	2.59	I
Access to professional development that is appropriate	2	4.00	2.13	I
Access to professional development from school management or leadership team	1	3.17	2.19	I

Note: I = Institutional barrier

Despite access to facilities being perceived as the greatest barrier to teaching, 81% of respondents rated facilities as ‘acceptable’ (36%), ‘very good’ (35%) or ‘exceptional’ (10%). In contrast to the respondents who were satisfied with their facilities, the remaining respondents thought their facilities were ‘barely acceptable’ (16%) or ‘unacceptable’ (3%). Although access to equipment was the third highest ranked barrier reported (Table 4.2), 91% of respondents reported that their standard of equipment was acceptable or better, with no teachers reporting having unacceptable equipment. There were no associations found between the rating of equipment or facilities and respondents’ gender, years of teaching experience, school location, school size or position of responsibility held.

4.4.3 Perceived barriers to student participation

Teachers were asked to select from a list including an ‘other’ option and rank the top five barriers they perceived as restricting student participation. These included *institutional*, *student*- and *teacher-related* barriers (Table 4.3: Figure 4.2).

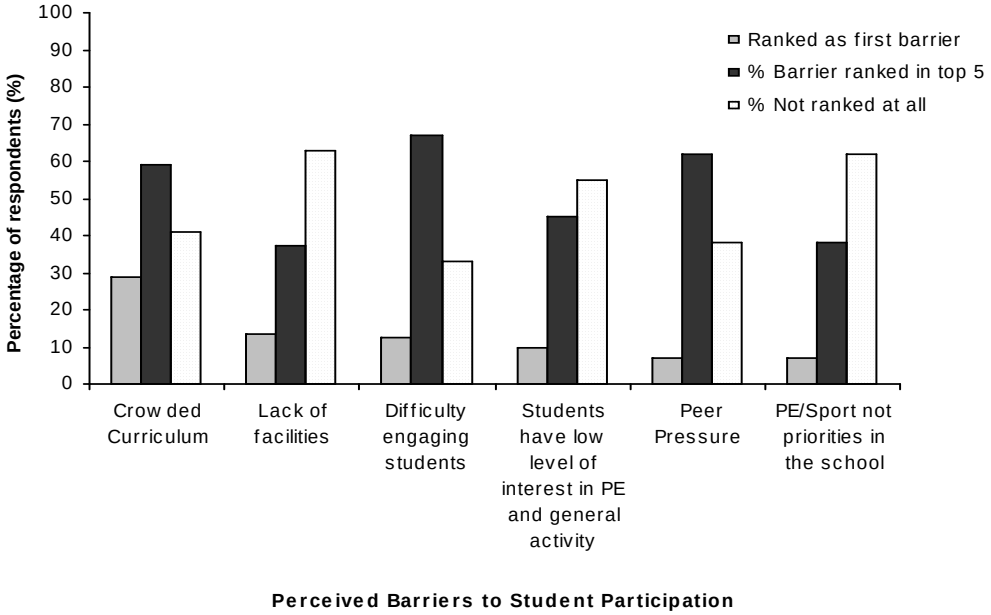


FIGURE 4.2: Victorian state secondary school specialist physical education teachers’ perceived top five barriers to students accessing physical education and physical activity in schools

TABLE 4.3: Perceived barriers to student participation in physical education and physical activity in Victorian state secondary schools: physical education teachers' ranking from most ('5') to least ('1') influential

Barriers INSIDE school (n=73)	Ranking[a]	Influential barrier					% of respondents ranking barrier in their top 5	Barrier category[b]
		Most				Least		
		5	4	3	2	1		
Crowded curriculum	1	21	6	6	5	5	59	I
Lack of facilities	2	10	7	4	2	4	37	I
Difficulty engaging students	3	9	10	11	11	8	67	T
Students have low level of interest in PE[c] and PA[d]	4	7	11	5	5	5	45	S
Peer pressure	5=	5	7	9	13	11	62	S
PE[c]/Sport[e] not priorities in the school	5=	5	6	5	3	9	38	I
Focus on too many traditional sports	6	4	1	4	5	1	21	I
Past negative experiences with PE[c]	7	3	6	7	6	5	37	S
Large class sizes	8	2	6	7	5	2	30	I
The school environment does not encourage PA[d]	9	2	0	0	3	6	15	I
Cost of subject	10	1	5	8	5	3	30	I
Staff use outdated teaching methods	11	1	2	2	2	2	12	T
PE[c]/Sport[e] staff provide limited activity time	12	1	2	1	1	2	10	T
Semesterisation of units	13	1	1	0	1	3	8	I
Outdated curriculum	14	1	0	0	1	2	5	I
Lack of equipment	15	0	3	4	5	5	23	I

Note: [a]Ranking = based on most frequently ranked as number 1 barrier; [b] I= institutional barrier, T=teacher-related barrier, S= student-related barrier; [c]PE= physical education; [d]PA= physical activity [e]Sport=sport

The crowded curriculum, an *institutional* barrier, was ranked as the most influential by 29% of respondents in restricting students' access to physical education and physical activity in the school environment. By contrast, the most frequently chosen barrier (ranked most within the top five) by respondents was difficulty in engaging students (67%), with only a third of respondents not ranking it at all within their top five barriers to students in schools accessing physical education or physical activity (Table 4.3: Figure 4.2).

4.5 Discussion

Schools are well placed to promote health and physical activity behaviours because of the amount of time students spend in this environment and the elements of the school curriculum that are adaptable to include such content. However, barriers experienced by teachers and students and those imposed by the school as an institution are increasingly impacting on the role that physical education plays within schools. We have identified both *institutional* and *teacher-related* barriers that are similar to and complement the many primary school-based studies [28, 31, 32, 35]. However, this study provides further insights, demonstrating that there are different barriers that teachers may encounter when providing physical education in secondary schools, including those imposed by the students themselves.

The three highest-ranked barriers identified by teachers that specifically affect the provision of physical education are unique to physical education or any learning area that requires additional resources outside the four classroom walls. Access to facilities $\bar{x}$=8.10(2.3), suitable teaching spaces $\bar{x}$=7.95(2.15) and equipment $\bar{x}$=7.37(2.10) were the most highly-ranked barriers, underpinning the specificity of resources that are required in physical education (Table 4.2).These barriers are also acknowledged as considerable impediments to the provision of physical education in primary schools (Table 4.1).

Although *institutional*, these are all barriers that can, if carefully considered (and with good lesson planning and creativity, and departmental support and organisation) be overcome by teachers across all curriculum areas. In large schools in particular (in which many respondents teach), it is important to timetable so access to facilities is rotated, students experience learning in a range of environments and lessons can be planned appropriately to use the available space most effectively.

Furthermore, if appropriate quantities of equipment are not available, teachers can be creative and improvise activities using similarly shaped or sized pieces of equipment [148] or, alternatively, network with neighbouring schools to exchange equipment and spaces. It is also essential to investigate local facilities and programs that may add value to school programs, are easy to access and are cost effective. Teachers may be able to build or expand partnerships with local physical activity and wellness communities and create opportunities for students to be active inside and outside schools [149].

Of interest in this study is the finding that over two-thirds of respondents perceived that their own difficulty in engaging students, and therefore their own teaching, could impact on student participation (Table 4.3; Figure 4.2). No primary-based studies have comprehensively identified the difficulty experienced by teachers in engaging students in physical education, although some imply that intrinsic and motivational barriers influence participation at elementary levels [147, 148] (Table 4.1).

It has been suggested that teachers must know what to do to provide engaging experiences for all young people in physical education [150]. However, their ability to do so is influenced largely by the many factors identified by teachers as *institutional* barriers affecting their provision of physical education, such as a lack of equipment, facilities and teaching spaces (Table 4.2). It has been suggested that it is essential to engage students by developing and evaluating strategies to ensure their interests are met [148, 151]. This necessitates teachers developing activities that are attractive to a wide range of adolescent sub-cultures. Doing so

may overcome some of the difficulties and barriers to student participation. However, the simple offering of physical education opportunities that are innovative and well planned may not be enough to engage, excite or encourage participation and may even alienate students [140]. Similarly, other research has found that provision alone is not enough to guarantee participation and engagement [151].

Teachers claimed that students were responsible in part for their own barriers in secondary schools; a low level of interest in physical education and physical activity (45%) and, more notably, peer pressure (62%) were among the most frequently ranked barriers to participation (Table 4.3). Research has found primary-aged students made connections between exercise, boredom and not having fun in physical education as early as the third grade [148]. Interestingly, researchers have also argued that most young children have a positive perception of physical education, but as they grow older, that perception becomes more ambiguous [146].

During the transition to and immersion in secondary school, adolescents are often taking greater ownership of their own decisions and attitudes toward both academic learning and physical activity, and this transition itself highlights that different influences will affect their choices to participate, including cognitive, behavioural and environmental factors [43].

The school environment is a very influential social determinant of physical activity and constant interaction with peers can greatly affect choices, including participation in physical education and physical activity. A recent study found that peers and friends may promote physical activity and increase motivation to participate [152]. This finding, taken with the views of the respondents in the present survey, suggests that partner and group work or peer-led activities may be useful in attempting to engage students in physical education and physical activity. Empowering students by offering elective topics, non-traditional activities or initiative games and increasing their role and responsibilities in class by using such

pedagogical models as the sport education in physical education model (SEPEP) [16] could be ways to provide positive peer interaction that encourages and promotes activity.

In addition to peer pressure, previously self-reported influences on adolescent physical activity choices have included not being in the mood; lacking energy, motivation, interest or desire; and having other interests not related to physical activity [145, 153, 154]. Teachers' concerns reported by one study suggests that the limited provision of primary school physical education and play opportunities may be affecting the participation and fitness levels of students as they venture into secondary school [36]. Furthermore, teachers reported that students at secondary school were increasingly being faced with the lure of sedentary behaviour that could lead to lower fitness levels and physical ability and that this in itself might affect participation [36].

In the present study, teachers reported that they perceived students' levels of fitness declined as they got older and consequently there were a decreasing number of students who were perceived to have an 'average' or 'above-average' level of fitness. This trend has also been reported by previous studies [154-156]. The significant drop in fitness levels perceived by teachers at the Years 9 and 10 levels, particularly in smaller (≤ 800 students) and rural or remote schools could be attributed to changes in interests or attitudes, a greater focus on academic and career progression, or, possibly, fewer physical education and sport programs being offered at higher Year levels [157]. The implications for teachers of these decreases in fitness levels is quite substantial, particularly as a decline in general fitness in students can often result in a reluctance to participate due to an inability to complete physical tasks.

The crowded curriculum (Table 4.3: Rank1) and timetabling (Table 4.2: Rank 7) are symbiotic in their relationship, with one often having a great effect on the other. As early as 1992, the Senate Inquiry [4], followed by the Moneghetti Report [135], identified the crowded curriculum as a major barrier to Australian teachers providing physical education.

Primary-based studies have reported that in primary schools, physical education timetabling may be reduced or even eliminated as it is often deemed a peripheral subject [158]. This is particularly the case when qualified physical education teachers in primary and secondary schools have reportedly been declining or are in many cases non-existent [14].

Changes to the structure of secondary schooling represent an attempt to meet the needs of diverse populations and ensure that many options are available for all students. However, at times this can be to the detriment of physical education. The identification in this study of timetabling as a barrier may relate to decreases in time allocation, split periods for classes or perhaps too many classes on at once, which means increasing competition for equipment and facilities. Both were considered the biggest barriers to providing physical education in schools (Table 4.2).

Victorian state secondary schools are required to timetable and provide compulsory physical education from Year 7 to Year 10 (approximate ages 12-16). However, despite this assurance and teachers' concern that physical education should be implemented, this mandate is not always met [157]. This is a notion reported as not uncommon: the gap between actual policy and implementation is widespread and interests compete for timetable and curriculum space [29]. It is essential that teachers be able to justify why physical education is in the school curriculum (beside the fact that it is 'compulsory') and be knowledgeable about the value of physical education to the school, to students, other colleagues, management and leadership teams and those who make public and school policy decisions [30].

Despite ranking many of these components as being less significant (Table 4.2); to address some of the barriers they rate more highly, physical education teachers must be in a strong position to negotiate, lobby and embed physical education in their schools and school curriculum. Access to professional development, strong leadership and support from all staff is imperative. With colleagues from smaller and rural schools being perceived as having

less respect for physical education, a strong understanding of the rationale for physical education becomes imperative.

4.6 Limitations

Teacher participation in the present study was conditional on the Principals' agreement, who, by forwarding relevant information to heads of department, expressed their consent. The researcher assumed that all schools had access to the internet and that each school's email mailbox was cleared daily and directed to the appropriate people. This chain of communication may have been hampered by technology problems or the failure of someone to pass on information.

A potential limitation of this study is that it obtained self-reported data and therefore teachers may not have accurately represented the physical and school sport programs delivered in their schools. However, obtaining teacher perceptions of their curriculum areas necessitates the utilisation of self-reported data.

Teachers may have tended to claim that institutional or student-related barriers had a greater influence on student participation than their own teaching or decisions made in the physical education department, to avoid reflecting poorly on their teaching or their schools. Nevertheless, teachers' own ability to engage students was rated highly as a barrier to providing quality physical education.

4.7 Conclusion

Teachers are participants in an institutionalised system influenced by a myriad of complex factors. This research provides evidence that in physical education, which operates outside the traditional classroom, reported barriers and barriers that teacher's perceive to influence student participation are largely *institutional* and therefore support the hypothesis. Some of these barriers can be planned for and overcome, but others require considerable

negotiation, lobbying and strong leadership: in particular, to gain access to and funding for equipment, facilities, teaching spaces and curriculum positioning.

It is evident that many barriers to providing quality physical education programs have not changed over time: they have merely evolved and become more complex in their own context, in both primary and secondary settings. A focus on addressing *institutional* barriers alone is no longer possible, particularly as teachers report that students are increasingly responsible for their own educational and physical activity choices and, consequently, their participation or non-participation in physical education. A plethora of influences in the school environment now vie for each student's time, attention and participation. The role to which physical educators should aspire involves developing creative, well-planned, engaging and responsibility-focused lessons, and the confidence and ability to do so is recognised by many teachers as a challenging barrier to their own teaching.

Although there are both differences and similarities between the experiences of primary and secondary physical education teachers, an increased awareness of these barriers among teachers at both levels and among practising and pre-service teachers is of vital importance. This awareness will support the continuing development of quality physical education programs, teaching strategies and teaching skills to overcome these barriers, both now and into the future.

CHAPTER 5

The GLAMA (Girls! Lead! Achieve! Mentor! Activate) Pilot Study

CHAPTER FIVE: The GLAMA Pilot Study

5.1 Preface

Ascertaining the barriers to physical education and physical activity in secondary school provided valuable knowledge and understanding of the constraints and enablers associated with the school environment which led to the development and implementation of the GLAMA (Girls! Lead! Achieve! Mentor! Activate!) intervention. The aim of this study was to determine the effectiveness of the training provided for Year 10 peer leaders to equip them with the skills required to successfully lead a group of four to six Year 7 girls through a variety of cognitive, physical and affective challenge based activities. Furthermore, the suitability of challenge activities for Year 7 students and the barriers to the implementation of the intervention within the school environment were also assessed. The assessment of the GLAMA pilot was conducted using the RE-AIM framework. This chapter is based on a peer-reviewed paper published in *BMC Public Health* (Appendix A).

5.2 Introduction

Schools are recognised as key health settings and their importance in promoting knowledge of physical activity and healthy lifestyle behaviours via physical education and physical activity programs is well documented [76, 77]. Despite this recognition, there are a lack of effective intervention strategies to promote physical activity in school children; therefore the development of effective physical activity interventions in schools continues to be a priority [37]. Nevertheless, promoting physical activity and healthy lifestyle behaviours among children and adolescents is a complex challenge [159], especially in a school context with many competing educational outcomes and institutional constraints.

School-based interventions are appropriate in many ways due to the level of continuous, intensive contact with students during their developmental years [160]. However, previously reported difficulties with implementing a range of interventions in schools have included the;

lack of teacher participation, lack of program readiness, absence of program advocates, inadequacy of funding, reduction in infrastructure, poor association between the program's key features and organization routines, limited teacher training and support, insufficient amount of program materials, and inconsistent staffing [39-41]. Ultimately, effective interventions require the combination of careful planning and the engagement of the whole school community.

Notwithstanding the difficulties associated with implementing school-based interventions, the constant drive for schools and teachers to meet students' needs necessitates the adaptation of existing content as well as the successful implementation of new initiatives and interventions. Teachers are aware of their own difficulties facilitating engaging programs, especially in the area of physical activity and physical education [48]. Subsequently, teachers need to consider a range of teaching strategies, styles and methods for student engagement to ensure learning outcomes for all students.

One such strategy which involves peer-assisted learning, encourages development across all learning domains. Peer-assisted learning, teaching, tutoring or mentoring [50] are frequently interchanged terms. The commonality is that each strategy is underpinned by a learning process whereby students learn from and with others; this can be with students of the same-age or from those who are older (cross-age). Peer-assisted learning in physical education and physical activity may overcome some aspects that impede student learning, enjoyment and participation by providing opportunities for increased levels of feedback, social learning and less direct instruction from the teacher [54]. This is particularly important for all adolescents, but especially girls who experience greater age-related declines in physical activity levels [161] and may not be attracted to the sometimes competitive, rigorous and the potentially uncomfortable nature of physical education [151].

Peer-assisted learning appears to be an excellent vehicle for participant improvements to health/nutrition outcomes [85, 162], physical activity participation including increasing on

task behaviours [90-93], skill development [86, 87, 94, 96, 97], and self-efficacy [86, 96]. More specifically, a recent study of peer-assisted learning in a physical activity leaders (PAL) program which used resistance training in adolescent boys reported significant reductions of several physiological outcomes [63], supporting previous findings from a lunchtime peer led activity program which also reported encouraging physiological changes in adolescents [82].

If peer-assisted learning is conducted within a cross-age or same-age context then leadership opportunities are also provided for students. Whilst undertaking the role of ' peer tutor' or 'peer leader', the benefits reported have included; enhanced understanding of concepts, increased self-determination, improved reorganization, clarification and knowledge building skills [64]. These leadership qualities are not exclusive to physical activity contexts. Promising peer-assisted learning programs in remedial settings and other curriculum areas [55-58], highlight that programs outside those which are traditionally teacher-led, may be successful in influencing student behaviour.

The RE-AIM health promotion evaluation framework [163] has been used to evaluate the multi-faceted components of interventions. The framework has previously been used in studies in primary school physical activity interventions [159, 160, 164] and community sport contexts [165]. The benefits of using the RE-AIM health promotion evaluation framework [163] are that it enables complex settings based interventions, such as those in school settings, to be comprehensively evaluated.

In summary, considering the potential benefits for students associated with peer-assisted learning such as leadership development, increases in psychosocial and physiological outcomes in addition to increasing physical activity participation, an intervention in schools that provides opportunities to develop these components and can also engage girls should be considered. In an attempt to address the aforementioned parameters: the GLAMA (Girls!

Lead! Achieve! Mentor! Activate!) peer leadership and physical activity intervention was developed.

5.2.1 Aims

This study aimed to describe the process evaluation of the GLAMA pilot project and specifically focused on the evaluation of the intervention constructs including the:

i) Effectiveness of leadership training and leader preparedness

ii) Activity suitability and participation

iii) Barriers to implementation and solutions to overcome these to enable successful application in a wider school population.

Therefore, it was hypothesised that the implementation of this physical activity intervention pilot study will be influenced more by *institutional* barriers than *student-related* or *teacher-related* barriers.

5.3 Method

The RE-AIM health promotion evaluation framework [163] was used to evaluate the integral intervention components. Evaluating the pilot is crucial to ensure its future development and dissemination is successful. Therefore, the use of a framework at the setting level as well as the individual participant level will assist the development of interventions that are applicable to the unique nature of school environments. Specific aspects of the program evaluated are detailed in Table 5.1.

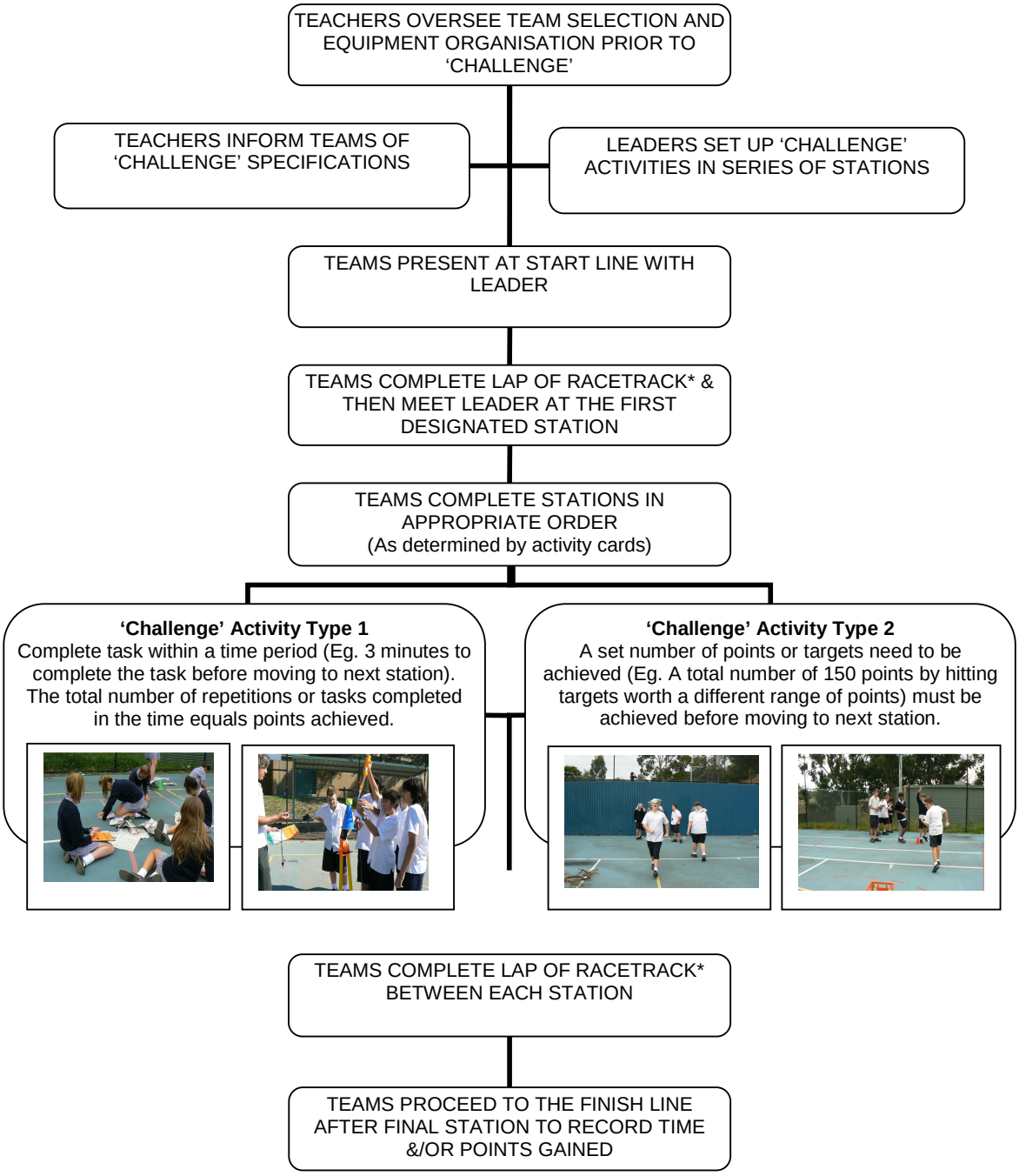
TABLE 5.1: RE-AIM health promotion evaluation framework dimensions and definitions relevant to the GLAMA intervention at both individual and setting levels

Dimension	How ability to reach dimension was measured.
Reach	Refers to the representativeness of the school and the individuals' willingness to participate in the study. Reasons for non-participation were included after being gathered from teachers and participating leaders.
Efficacy/ Effectiveness	Considers the effectiveness of the intervention at influencing primary outcome changes as well as assessing whether positive or negative outcomes were experienced by individuals or within the school setting.
Adoption	Refers to the schools acceptance of the intervention within the organization and examination of the factors that influenced that decision.
Implementation	Refers to the extent to which the participating students and school completed and made use of the various components of the intervention. This was measured by the level to which the main intervention components, including leadership training, activities and evaluations were completed as intended.
Maintenance	Refers to the extent to which schools and leaders maintained or continued with the intervention. This was difficult to assess given it was a pilot project.

Adapted from Austin, Bell, Caperchione & Mummery (2011)

5.3.1 Intervention development

The intervention was designed to develop and foster leadership skills in Year 10 girls (peer leaders) so they were capable of leading a group of four to six girls of a younger age (Year 7) in a range of physical, cognitive and team focused activities. Based primarily on Bandura's Social Cognitive Theory (SCT) [43], the intervention was aligned with the theoretical constructs of the SCT as defined by Abraham and Michie [166]. These include the frameworks of: providing general encouragement, providing instructions, modelling and demonstrating the behaviour required, prompt intentional formation and barrier identification [166]. In the GLAMA pilot study, this was operationalised by having peers provide encouragement during all the challenge activities and pre-activity discussions, leaders demonstrating and modelling the desired behaviour when interacting with the Year 7 students and when explaining each of the activities.



*Note: *Racetrack is a circuit of approximately 20-30 metres in distance. Its' intention is to provide the leaders time to move to the next station and prepare for their teams arrival when they need to explain the next task. The racetrack also provides additional physical activity between each station which is important during the more cognitively directed challenges.*

FIGURE 5.1: Activity 'challenge' format.

The intervention concept was also driven by the previous teaching experiences of the research team and our research into teacher perceptions, barriers and ability to implement physical education and physical activity in schools [48, 157]. Ethical approval was obtained from both a University Human Research Ethics Committee and the state Department of Education and Early Childhood Development. Parental and participant dual consent was obtained for participation in the leadership program and for questionnaire completion.

The activities used in the program were guided by an 'Adventure Racing' concept [167] and were based on providing opportunities to complete 'challenges' in groups before moving forward to the next activity. A 'racetrack' consisting of a lap of the gymnasium court was also included between activities. The basic structure of each 'challenge' is outlined in Figure 5.1. No 'challenges' required a high level of pre-existing motor skills or particular sporting attributes. Primarily, 'challenges' focused on team work, cognitive strategies, and opportunities to develop positive physical activity experiences. The venue for each 'challenge' was a school gymnasium, but activities could easily have been conducted in a range of indoor or outdoor environments.

5.3.2 Participants

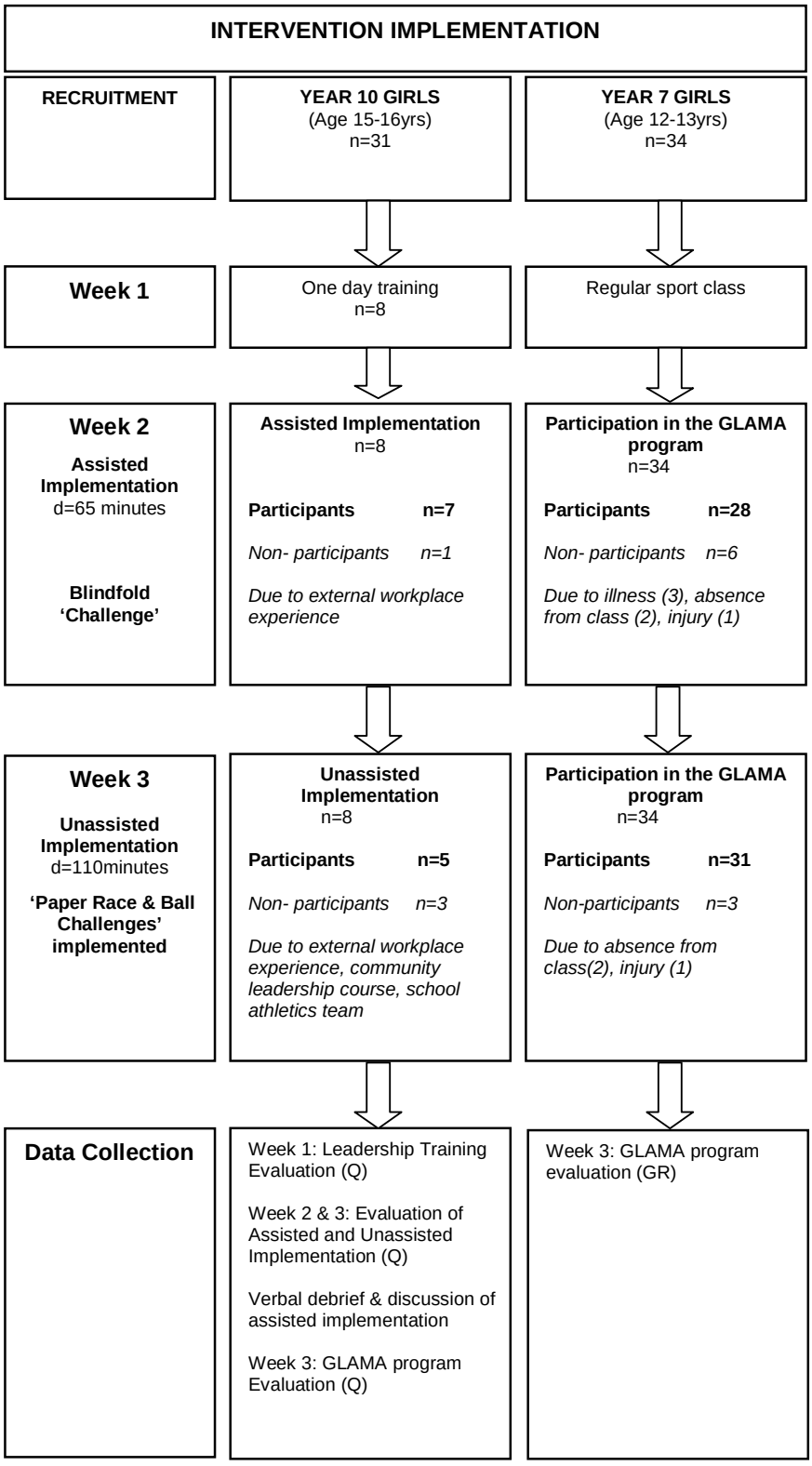
Participation by the state secondary school occurred after teachers indicated interest in a leadership and physical activity program. The rural school had a Student Family Occupation (SFO) Index rating (as determined by the state Education Department) [168] of medium which was within the desired low-medium rating for the study. A total of 67% of state secondary schools within the state currently have this rating. Three physical education teachers were involved in facilitating the project; two taught the Year 7 girls and one teacher recruited and liaised with Year 10 peer leaders to assist with the leadership training and program implementation.

All Year 7 girls (12-13 years old) and Year 10 girls (15-16 years old) at the school were invited to participate via an assembly at which information was provided (Figure 5.2). Year 10 peer leaders were provided with music vouchers in appreciation of the time commitment required to lead the Year 7 students. Girls were chosen as our target demographic as they are often underserved in terms of encouragement and opportunities to partake in both physical activity and leadership development, particularly in rural communities [169]. Importantly, the declining participation rates, predominately in girls as they progress through secondary school were also considered a vital element to consider and attempt to address [151, 161].

5.3.3 Implementation

The intervention was conducted during October, 2010. Following recruitment, training was completed with the Year 10 peer leaders (Figure 5.2). We used a 'train the trainer' model which has been successfully incorporated in many health contexts [170, 171] and appears to be appropriate in meeting outcomes in educational contexts [172, 173]. The aim of the one day of leadership training conducted by researchers was to develop appropriate skills to enable peer leaders to lead their small team. The training specifically involved theoretical components, questioning, partner activities, brainstorming and group discussion to facilitate development. The following five key areas were addressed: understanding and developing leadership characteristics, developing communication skills, developing management skills to lead their group, and behaviour and motivation modification techniques. They also participated in the 'challenge' activities in which the role-modelling of both leader and participants took place.

The GLAMA program was conducted during the regular sport curriculum time. In the intervention school, the sport program focused on gaining knowledge of game structures and strategies through participation in traditional games with few modifications. This is in contrast to fundamental skill development through activities and modified games provided in



Note: d= duration of challenge; Q= Questionnaire; GR= group response

FIGURE 5.2: GLAMA intervention pilot project implementation timeline

physical education. Therefore, teachers felt it was appropriate to implement “team-based” activities in their curriculum with the GLAMA intervention able to meet similar outcomes (physical activity, team building, and social outcomes) to those encouraged in a traditional sport unit.

The first assisted implementation was guided by the researchers and the three physical education teachers during week two (Figure 5.2). Year 7 teams were carefully chosen and considered friendship groups and positive, constructive relationships avoiding any confrontational issues which had concerned teachers previously. Peer leaders then completed the introduction session of 10 minutes with their Year 7 team including getting to know you activities and team identity formation through the establishment of rules and a team name. Teams and peer leaders then commenced the ‘Blindfold Challenge’. The session was shorter than anticipated and went for 65 minutes due to externally imposed constraints of the school timetable. The final unassisted implementation of the ‘Paper Race’ and ‘Ball Challenge’ occurred during week three. Due to three peer leaders missing, some teams were merged with others to accommodate this. Peer leaders independently led and implemented activities with their group with assistance only provided by teachers and researchers when setting up equipment. The session duration was for the entire class time, in total 110 minutes.

5.3.4 Data collection

Data collection focused firstly on the one day training program provided for peer leaders (Figure 5.2). Data were collected using project specific questionnaires to evaluate the effectiveness of the training program in providing the required skills and engaging peer leaders in their forthcoming role. Secondly, the overall GLAMA intervention was evaluated by peer leaders, teachers and researchers after completion of the intervention. It entailed the use of a mixed methods approach including questionnaires, reporting on observations and feedback from students. The researchers implemented the training and observed all sessions conducted by the peer leaders. Evidence derived in a mixed method approach can

offer guidance on how to create conditions for successful adoption, implementation and maintenance of interventions [160]. As it was not the intention, no behaviour change data were collected from students.

5.4 Results

5.4.1 Results for the dimension REACH

Two Year 7 girls' only classes with 34 girls in total were available for recruitment (Figure 5.2). The physical education teachers encouraged all girls to participate. However, if they chose not to they were offered alternative sport opportunities in other classes during the intervention period. Participation during assisted implementation (n=28) and unassisted implementation (n=31) was high due to the program being run during curriculum time (Figure 5.2).

A total of 31 Year 10 girls were available for leadership training: eight girls completed the training (Figure 5.2). Year 10 peer leaders were difficult to reach with problems recruiting identified as: existing commitments to a large range of school programs, reluctance to leave classes (as they would have to catch up on missed content), and unwillingness to work with Year 7 girls. There was also hesitation to engage in physical activity promotion or participation themselves despite the potential leadership advantages being gained and a small voucher being offered as an appreciation of their time and involvement.

The three teachers were accessible and responded to requests for information promptly. Both Year 7 physical education teachers agreed that they had difficulty throughout the year engaging their Year 7 girls in sport and were appreciative of the opportunity to try a different approach in an attempt to engage their students.

5.4.2 Results for the dimension EFFICACY

Outcome 1: The effectiveness of leadership training and leader preparedness

Training priorities were to equip peer leaders with skills to understand content, competently deliver it and engage their teams. All training was implemented by the researchers. The results for leadership training and leader preparedness are shown in Table 5.2. Despite only one day of training prior to the program commencing, leadership training was positively rated amongst the eight peer leaders with 100% of leaders reporting that after the completion of training they had the confidence to lead a group of Year 7 girls through the program (Table 5.2). All peer leaders were ready (25%), very ready (63%) or extremely ready (12%) to lead their groups after training. Uncertainty surrounding leadership preparedness after the first assisted implementation related to difficulties with activities (remembering them the week following training), and understanding the written instructions. In evaluating the program, all peer leaders believed that their training equipped them with the skills to lead their team throughout the whole intervention (Table 5.2).

The researcher's observations of the positive outcomes of training and ability to implement training objectives during the intervention included the peer leaders: prompt setting up and organisation across all three challenges, selection and use of appropriate equipment, use of learned motivational techniques to encourage their team, quick movement between 'challenges', giving assistance when required to prompt their team in cognitive activities, use of activity cards and score sheets appropriately when difficulties arose.

Outcome 2: Activity suitability and participation

Year 7 Girls

The first activity, the 'Blindfold Challenge' was selected as it requires significant team work, communication, trust and a whole team contribution. The feedback teachers received from Year 7 students regarding the GLAMA program have been presented in Table 5.3. They have been grouped into common themes and focus on activity or program components,

TABLE 5.2: The effectiveness of leadership training and level of leader preparedness in Year 10 student leaders

When	Outcome Measured	Description	Result	Sample Comments
After Leadership training (n=8) Week 1	Leadership training	1. Would you be confident in leading a group of 4-5 Year 7 girls in the activities? (A)	Yes= 100%	N/A
		2. Would you be confident in leading your peers in the activities?(A)	Yes= 100%	N/A
	Leader preparedness	3. How 'READY' are you to lead your group of Year 7 girls?(B)	Ready=25% Very Ready= 63% Extremely Ready=12%	N/A
After assisted implementation (n=7) Week 2	Leader preparedness	4. Did you find anything difficult about: a) any activities(A)	No= 86% Not sure= 14%	"A bit hazy on most, needed showing what the activities were"
		b) working with year 7 students(A)	No= 100%	N/A
		c) understanding written instructions(A)	No= 86% Not sure= 14%	"Some were a bit confusing".
		d) using equipment(A)	No= 100%	N/A
		e) comprehending the challenge(A)	No= 86% Not sure= 14%	N/A
		f) leading the group(A)	No= 100%	N/A
	Leader preparedness	5. Did you feel confident leading your group in the activities today? (A)	Yes= 86% Not sure= 14%	"I was excited to be a leader for the Year 7's".

	Leader preparedness	6. How 'READY' are you to lead your group of Year 7 girls again next week? (B)	Ready= 28.5% Very Ready= 43% Extremely Ready= 28.5%	N/A
	Leader preparedness	7. How 'MOTIVATED' are you to work with your group again next week?(B)	Fairly Motivated= 43% Very Motivated= 43% Extremely Motivated= 14%	N/A
Debrief session between implementations (n=7)	Leader preparedness	8. A debrief session provided for leaders to discuss their first session and address any difficulties that they may have experienced in preparation for the next implementation. No structured questions were asked.	N/A	N/A
After unassisted implementation Program evaluation (n=7) Week 3	Leadership training	9. Did your training equip you with the skills to lead your team?(A)	Yes= 100%	"It was hard to getting the girls motivated…" "We didn't have enough time to complete the challenge" "At the beginning everyone was shy…" "I had difficulty engaging them"
	Leader preparedness	10. Were you adequately prepared each week to lead your group?(A)	Yes= 71% Not sure= 29%	N/A
		11. Did you like leading and working as part of a team to achieve the challenges?(A)	Yes= 86% Not sure= 14%	N/A

Note: (A)= 3 point Likert scale= "Yes", "No", "Not sure"; (B) =5 point Likert scale="Not at all", "Close", "Ready", "Very", "Extremely"; Assisted implementation= first session where leaders were given assistance as required from teachers; Unassisted implementation=second session when leaders worked independently to lead their groups

team work, and peer leader relationships. In summary, the Year 7 girls enjoyed many elements of the activities. However, the 'racetrack' component of the challenges was not viewed quite as favourably (Table 5.3). Working with peer leaders, with peers and in teams was well received. In relation to affective development opportunities; girls wanted to choose their own groups, but also commented that swapping groups to work with others may also be of benefit to helping them get to know people.

TABLE 5.3: Participant responses to selected questions from the program evaluation (Year 7 and Year 10) following the GLAMA pilot program

	What was the best part of the GLAMA program?	**What was the worst part of the GLAMA program?**
YEAR 7 RESPONSES (n=31)		
Activity/Program	"All the activities were fun" "The first weeks' activities (referring to the Blindfold Challenge)" "It was fun" "We liked that it was competitive" "Helps you to get fit"	"We had to run a lap after every activity" "The running a lap" "Running around the room"
Team Work	"Working in teams" "Working with others" "Working with my friends" "Working together" "Helps you to get to know people"	"We wanted to choose own group" "It was different because you weren't working with friends" "We should swap groups after every challenge"
Peer leader Relationships	"Working with a year 10 leader was good as they are not so cranky and are different to teachers" "Because the Year 10's are closer to age group…easier to connect to" "Lots of positive feedback from the leaders"	
YEAR 10 RESPONSES (n=7)		
Activity/Program	"It was fun and exciting" "Everyone had fun" "It was mostly good" "It was great, except I missed the second session"	"That it was at the end of the day" "Packing up" "Filling out surveys"
Team Work	"Getting to work with and help the Year 7's" "It was something new…I got to work with people who I wouldn't normally" "Helping out the Year 7's"	"Some of the girls (Yr 7's) were a bit lazy to begin with"
Peer leader Relationships	"Being with the girls" "Communicating with the Year 7 girls and getting them motivated"	

In terms of active participation, the researcher noted that Year 7 participation increased following the first implementation (n=28) where three of six non-participants sat themselves out prior to commencing the activities. There was a different atmosphere during the second implementation (n=31) when students were anticipating the next ‘challenges’. Only one student was sitting out due to an injury, the other two students were absent from class. It was evident throughout three ‘challenges’ that students were engaged, working as a team and actively completed laps of the racetrack by either running or walking fast. Only one student decided not to take part in the final ‘challenge’ activity.

Year 10 Peer Leaders

All seven peer leaders who completed the training and implemented at least one ‘challenge’ completed the program evaluation. One peer leader was only available for the training and did not implement any ‘challenges’. As was the case for Year 7 students, responses were themed (Table 5.3). To summarize the findings reported by peer leaders, the activities were perceived as fun. However, some aspects such as filling out surveys, the time of the day when delivered and packing up were small process issues which detracted from their enjoyment. Nevertheless, the experience of being peer leaders was underpinned by their enjoyment of being and communicating with, and helping the Year 7 students.

Teachers

Both Year 7 physical education teachers were asked to respond to a series of questions relevant to the outcomes of peer leader preparedness, activity participation and suitability. Their responses have been compiled (Table 5.4) and highlight the suitability of the activities for motivating students to participate. The program also assisted in drawing attention to components of the activities that should be further considered; competitiveness, student groupings, timing of the activities in the school year, and engaging otherwise disengaged students.

TABLE 5.4: Physical education teacher responses to the GLAMA programs' ability to meet the primary outcomes.

Teacher Responses	Leadership Preparedness	Activity Participation	Activity Suitability
Teacher (1)	"It was definitely beneficial having the year 10 students involved….younger students looked up to them and I think they almost wanted to prove themselves to them, to show them that they were capable of being mature and capable of performing skills. It was fantastic to see the Year 10's step up and take on a leadership role within the school." (1)	"During the first session we saw many of the students who do not usually participate having a go at all the activities (which was a big positive).....students worked well with students who they do not usually work with…enthusiasm and confidence increased. We saw some of the 'typical' non-participants pull out half way through activities during the second session. This could have been due to a decline in confidence as some of the activities were harder than the previous week's activities." (1)	"A program like this would be extremely beneficial for year 7 girls at the start of the year as many of the students would not have formed close friendships yet…..give students a chance to work with everyone in a positive team environment. In addition…….this allows students who are not so confident or do not like physical activity to participate in physical activity without even knowing it. Students such as this may see physical activity as a positive and fun thing rather than an exhausting task." (1)
Teacher (2)	"…Year 10 students seem to engage the Year 7 students. They were able to get students who don't normally participate to have a go, which was great to see." (2)	"Team work was one aspect that I think improved (through participation) as well as developing new friendships." (2)	"I would consider continuing on; it's just a matter of getting our hands on the right resources." (2)

5.4.3 Results for the dimension ADOPTION

The physical education teacher who recruited the Year 10 peer leaders and completed the training with leaders was highly motivated in terms of implementing the GLAMA project. The two Year 7 physical education teachers were also supportive of the project. However, factors which hindered their full involvement included: a deficiency in knowledge of program development, program structures and implementation procedures. Other factors that may have influenced adoption were the schools extra curricula programs that occurred simultaneously and included another external leadership opportunity, sports team commitments, academic testing and workplace experience. Timetabling priorities also affected the first assisted implementation, with class time reduced to facilitate a presentation assembly.

5.4.4 Results for the dimension IMPLEMENTATION

The pilot school implemented most components of the program. Factors limiting the implementation process included;

- Peer leader availability: Seven peer leaders completed the first assisted implementation and only five leaders were available for the unassisted implementation. Absences were due to sporting team commitments, external school courses, workplace experience and other school programs (Figure 5.2).
- Year 7 participant absences: Absences were due to illness, sporting or other school commitments such as music lessons (Figure 5.2).
- Duration: Initially the pilot was designed over a six week period. This was to include two days of leadership training in the first week. This was to then be followed by four "in class" sessions for 65 minutes per week over a four week period (4 x 65minutes). It would then conclude with the lunchtime sessions, one lunchtime session of 40 minutes per week for the duration of two weeks (2 x 40minutes).

  However, the school would only release the Year 10 leaders for one day of training. Additionally, it was decided between staff and researcher that the four single sessions could be provided in two double sessions, therefore including the exact same content but over a shorter duration (two weeks rather than four weeks). Circumstances beyond the control of the researcher reduced one double session to only one single session.

  The peer leaders were very reluctant to give up their time to commit to a program over a total of 6 weeks but were happy to do so over a lesser time frame. The peer leaders also considered their lunchtime as an important period of the day and therefore after discussions with them it was decided to remove the lunchtime component. Year 7 students when asked also suggested their own time to socialise at lunchtime was more important than participating in the program.

- Team selection: In this pilot program teams were selected by teachers prior to the program. However, one teacher noted that *"...perhaps, teamwork declined a little in the second session as some of the students believed they should have been given the opportunity to work with their friends..." (Teacher 1).*
- Time and cost of intervention: All three 'challenges' involved equipment that was sourced from around the school and from the physical education resources already available. The main cost was in student time taken away from class. For the peer leaders, classes missed had to be made up in their own time. For Year 7 students, because it was during curriculum time the impact was minimal.
- Time of year for implementation: The program was implemented toward the end of the school year when friendship groups have already been established in Year 7. Year 10 peer leaders also had competing demands of preparing for exams.

5.4.5 Results for the dimension MAINTENANCE

As this was a pilot intervention, maintenance was difficult to evaluate because of the short duration. However, a positive result was reported by physical education teachers at the intervention school during December 2010. Of the leadership group who completed training, seven of the eight Year 10 peer leaders continued their leadership at the school and were peer support leaders for the Year 7 students the following year.

A review of outcomes including the potential barriers and possible solutions to enable successful implementation and dissemination of this project in the future can be found in Table 5.5. The three main considerations that need to be addressed and were evident across more than one RE-AIM dimension include:

i. Developing teacher, school and student participation.
ii. Translation of leadership training.
iii. Consistent activity implementation.

TABLE 5.5: Potential barriers and solutions for GLAMA intervention using the RE-AIM[1] health promotion evaluation framework

DIMENSION	POTENTIAL BARRIERS	POTENTIAL SOLUTIONS
Reach	***Future implementation of a school intervention of this design must consider the following to best target individual participants and school settings:***	
S	1. Implementation during school curriculum time.	1. Engage schools in program implementation during curriculum PE or sport or potentially as an adjunct to 'Peer Support' Year 7 mentoring programs that many schools already provide. Students may not want to participate during their own free time such as lunchtime.
S	2. Have support and develop knowledge of the program with all teaching staff.	2. Develop support from school and staff by providing appropriate professional development and handout information prior to implementation. Must highlight benefits to staff and students of their own participation.
S	3. Ensure program is not competing against other school based programs for time.	3. Consult school calendar and highlight benefits of program for school transition, school connectedness, and psychosocial development.
LT	4. Recruitment of leaders may need a different approach.	4. Program needs to be promoted as an opportunity not a right; therefore incentives may not be needed. Leaders need to be aware of benefits. Link to community service programs such as Duke of Edinburgh is possible. There also needs to be consideration of recruiting leaders who are not already involved in similar opportunities and who sit outside the traditional 'leader' mould.
LT	5. Return of consent forms may be an issue.	5. If considered a 'compulsory' program by the school and fully supported, there may be a higher return rate of consent forms.
Effectiveness /Efficacy	***Consideration of the following will be needed to ensure leader competency, confidence and preparedness:***	
LT	1. Training protocol.	**OUTCOME 1: Leadership training and leader preparedness.** 1. Training programs should be clearly designed to meet appropriate outcomes to ensure that it will enable successful implementation of the interventions. Leaders should gain knowledge in the five key areas established in this pilot.
LT	2. Training duration.	2. An intervention that is implemented over a longer duration would require more training to be able to conduct more 'challenges' and greater understanding of group dynamics, leadership skills and how to problem solve. Refresher training just prior to the first implementation should be undertaken to help check for understanding and address any concerns or apprehensions.
LT	3. Length of time between sessions.	3. 'Challenges' should be completed weekly to ensure a consistent team oriented approach otherwise leaders lose momentum and also understanding of tasks and their

		role.
LT	4. Reading and comprehending instructions for each activity.	4. Provide a booklet with all 'challenges' for leaders to take home and use to prepare. Ensure activity cards are clear and concise with diagrams and that leaders have opportunities to clarify before implementation.
LT	5. Opportunities to evaluate training and verbal feedback.	6. Leaders should be given the opportunity to provide both written and verbal feedback to help direct support they require to develop their leadership skills.
	The following issues need to be addressed when providing activities for Year 7 students:	
A	1. Sequencing activities correctly to engage students.	**OUTCOME 2: Activity suitability and participation** 1. The first task completed should be challenging, engaging and provide an opportunity for students to contribute to team success.
A	2. Removal or adaptation of racetrack.	2. The racetrack element should be carefully considered in terms of its: length, application in more cognitively based activities to encourage activity, its benefits to leader organisation, its location and participant understanding of its purpose, how frequently it is used and the primary outcomes of the program challenge.
A	3. Adding competitive elements.	3. Scoring should be consistent between activity challenges, easy to use and fully explained in the activity cards and booklets leaders have.
A	4. Grouping of students in teams	4. Appropriate grouping of teams and also leaders to teams is paramount to intervention success and should be considered carefully. If leaders are working with other leaders, this should also be considered. Teams should be small, between 4-6 students if possible.
LT	5. Leader interest and understanding of activities and ability to motivate students.	5. Leader motivation and interest will be critical to Year 7 activity participation. All leaders should apply for positions of responsibility and potentially demonstrate they have the capacity to undertake this role. Leaders must complete training that promotes positive relationship building, communication skills, problem solving and ability to work with others in groups.
A	6. Disappointment in team/grouping.	6. Inappropriate grouping may lead to decreases in participation. Year 7 groups and students should be monitored throughout the program with groups confirmed as early as possible if changes are required.
A	7. Concern about being part of a losing team.	7. Bonus points can be given by supervising staff to leaders and teams for assisting with equipment, organization and appropriate 'team work' to reward desirable team related outcomes.

A	8. Time to complete the activity.	8. Time periods must be designated for each challenge and be consistent throughout the program. This will allow scoring to also be consistent between activities.
Adoption	***The following issues need to be addressed to promote setting adoption:***	
S	1. Teacher knowledge and support of the program.	1. See REACH 1.
S	2. School culture including previous lack of success with students, motivational issues with students and negative experiences with physical activity.	2. The program should be promoted to all students, with leaders comprehending the importance of the role they will play. Motivational issues and negative experiences with physical activity can be negated by limiting racetrack lengths, careful team selection, ensure leaders are motivating and encouraging and appropriate challenge activity selection to meet student needs.
S	3. Too many extra curricula activities already offered by the school.	3. See REACH 3.
Implementation	***To encourage successful implementation of this intervention, the following components need to be considered:***	
S	1. Leader availability for each session.	1. A consistent time every week needs to be provided for both leaders and students to ensure they attend, can plan for and contribute to each session. If leaders are absent, it impacts greatly on their peers and also other teams.
S	2. Participant contribution to team each session.	2. All participants should be held accountable for their team success after each challenge. This could be in the form of contributing individual points or overall team points. Teams crossing the finish line together and presenting to leaders together is also an important component in achieving this.
S	3. Consent.	3. See REACH 4.
S	4. Length of program and training within the school program.	4. The training duration provided for leaders has to equate to the period of implementation.
S	5. Team Selection.	5. See EFFECTIVENESS Outcome 2, 4.
S	6. Time and cost.	6. The outlay for equipment is minimal. The time taken for leaders to leave their classes to conduct the program is the most costly aspect of the program. Potentially timetabling a Year 10 and Year 7 class together for PE, sport or Peer Support may alleviate this. Otherwise, classroom teachers need to be informed of when leaders will be missing and provide appropriate avenues for them to make up class time.
S	7. The time of year to deliver program the program to Year 7 students (weather,	7. One of the aims of the program is to assist with Year 7 transition and therefore the optimum time for delivery is Term 1 or Term 2 of the school year. Optimal training time for

	transition, exams, sport).	leaders also needs to be taken into consideration, with exams and other commitments sometimes filling senior students' diaries. Weather will also impact on location/facility requirements.
Maintenance	***For a school to maintain a program and embed it within the school, the following parameters should be addressed:***	
LT	1. The duration of training and when to deliver the training.	1. A comprehensive training program should be undertaken to ensure leaders are competent and capable in leading their Year 7 teams. Provision of training periods should be included within the school day. The timing of training should also be considered otherwise refresher training will need to be provided. If the program is to be delivered at the start of a year, consideration needs to be given to leader selection and training beginning at the end of the previous year (see also EFFECTIVENESS Outcome 1, 2).
S	2. Impact on school having both year 7 and year 10 students participating in program.	2. All Year 7 students should have opportunities to partake in the 'challenges'. The biggest impact will be on Year 10 students who will have to miss classes if classes are not timetabled concurrently.
S	3. Staff required.	Staff training is required for those staff that will be assisting Year 10 leaders when the program is actually running. This will enable them to provide valuable feedback while the student leaders implement the program. Recruitment of key staff that will help drive and oversee the intervention is crucial to its success. Ongoing training of new staff to a school setting is necessary.

Note: Potential barriers include those relevant to: S= staff and school; LT= Leadership training; A= Activity/program design, selection or participation; [1]Glasgow, Vogt & Boles (1999)

5.5 Discussion

Overall engagement of the school, teachers and students was appropriate during the pilot. All teachers attended each session, there was an increase in Year 7 participation over the three 'challenges' and the lowest attendance by peer leaders was five of the available seven students during week three which was affected by external school activities. Over a longer duration, gaining teacher and administration support in a school setting is imperative for intervention sustainability. Similarly to previous studies, we have found that having a 'program champion' to develop momentum and drive the program from within the school has shown to be influential in the success of school-based interventions [174, 175]. Importantly, in conjunction with appropriate staff training [175, 176], it can maximize opportunities for all involved and possibly enable the project to become embedded more broadly within the school culture.

For this peer-assisted intervention to be successful it must be provided within timetabled lessons, and possibly collaborate with other programs with similar objectives (promote school and social connectedness, foster leadership, increase physical activity). Secondary school intervention studies such as Trial of Activity for Adolescent Girls (TAAG) [177] and Fitness Improvement Lifestyle Awareness (FILA) [82] have similarly found that the compulsory context of curriculum-based sessions are important in enabling greater opportunities for intervention success. It was evident in both our study and FILA [82] which involved peer-assisted learning, that competing interests at lunchtime may impact on participation.

Supporting the developmental concepts of this pilot intervention, a recent systematic review of interventions that promote physical activity among young and adolescent girls' recommends that peer-assisted learning strategies such as mentoring or tutoring should be one focus of future physical activity research [178]. Although the aim of the pilot was to

specifically elucidate the effectiveness of the training for Year 10 leaders, the activities used with the Year 7 students and to see if there were any immediate barriers to the program within schools, it would be remiss to not address the fact that previous research has demonstrated the capacity to measure a range of different outcomes in peer learning contexts and these will need to be considered in the future implementation of the GLAMA program over a longer timeframe. These measures include physiological [86, 87, 94, 96, 97] as well as psychosocial outcomes [86, 90-93, 96]. Objective measures of physical activity for leaders and Year 7 students would be highly beneficial and relevant to the future implementation of the intervention.

One of the limiting factors of many peer-assisted learning interventions is the integrity of the leader training protocol and whether the training provided to leaders is sufficient to secure the desired outcomes of the program [64]. We have found our training to be somewhat successful after assessing researcher and teacher observations as well as peer leader evaluations, although completing the implementation of three 'challenges' is not a true reflection of training success. Importantly, gathering support from students to complete the training and engage in the intervention also needs further consideration. Physical activity, peer-assisted learning, or leadership opportunities are not attractive to all teachers or students. Further strategies would need to be considered on how to address these perceptions. Research has suggested that incorporating peer leaders to deliver interventions may possibly reduce the burden on teachers and may also promote responsibility in peer leaders and a greater understanding of the program resulting in higher retention [63]. These outcomes may be important for program champions to disseminate.

The design of the activities must provide opportunities for development across each of the learning domains: affective, cognitive and psychomotor. Supporting previous findings from the HIKCUPS study [179], our research has shown that detailed activities, equipment and the time for activities should be clearly available in manuals. In our study, these manuals

were provided for peer leaders. Furthermore, recommendations from HIKCUPS also highlight that the selection of activities need to be engaging as well as health promoting [179]. Our findings concur, activities need to be carefully sequenced, provide competitive elements which participants reported they enjoyed, involve careful team selection and have clearly defined, consistent scoring, and time periods during individual sessions as well as the entire program.

5.6 Limitations

Process evaluations are important components of intervention research [177]. The RE-AIM health promotion evaluation framework was used in this evaluation and has identified a range of different outcomes and limitations that should be considered prior to further implementation and dissemination of the GLAMA program. Firstly, the school chosen was rural, and despite being similarly ranked with two thirds of other schools within the Victorian state secondary system, the influences on rural students' participation in such programs may be different to their metropolitan counterparts. The sample of eight female leaders who undertook training and seven female leaders who implemented the project also limits external validity.

The use of self-report lends itself to reliability issues, memory bias and problems with concentration and comprehension [159]. In an attempt to overcome these problems, questionnaires were completed immediately after training, program implementation and program completion. Timetable restrictions dictated timeframes for completion of tasks and may have influenced results; however, this is the reality of conducting interventions in school settings.

The duration of the intervention for three weeks does not provide knowledge of the long term difficulties within the setting and with participants to be fully understood. Although not the

primary objective of this process evaluation, it also did not enable us to assess any immediate behavioural change in peer leaders or Year 7 girls, which is something interventions of a longer duration would need to consider.

5.7 Conclusion

Despite barriers experienced by students and teachers at an individual level, the factors having the greatest impact on intervention success are those coming from within the school setting: the structure of the curriculum, timetabling, pressure to meet curriculum and assessment content, lack of support for new initiatives, multiple programs already running within the school, time allowances for teachers, appropriate training for teachers, and support of students to participate. This supports the hypothesis that *institutional* barriers would influence the GLAMA pilot study more than *student-related* and *teacher-related* barriers. A school's ability to adopt, implement and maintain programs needs to be considered most prominently in planning future implementation of school-based physical activity interventions [160, 180] as well as those within other curriculum areas.

The GLAMA pilot intervention provided opportunities for leadership development, physical activity and social interactions for participants, all of which can be measured in its future application. Overall, it was a positive experience for Year 10 leaders, Year 7 girls and physical education teachers. The intervention should be revised using the recommendations from this study to further encourage a range of other school settings to adopt such programs, and considerations should include promoting involvement to both boys and girls in a cross-age environment over a longer duration.

CHAPTER 6

A peer leadership and physical activity intervention: The GLAMA(Girls! Lead! Achieve! Mentor! Activate) and BLAST (Boys! Lead! Activate! Succeed Together) Study

CHAPTER SIX: A peer leadership and physical activity intervention: The GLAMA & BLAST study

6.1 Preface

With the knowledge gained from the GLAMA (Girls! Lead! Achieve! Mentor! Activate!) pilot study regarding the effectiveness of training, suitability of activities, and barriers to providing the intervention in a school context, a refinement of the intervention was undertaken in consultation with the future intervention school. Careful consideration and selection of the appropriate school setting to adopt such a program was paramount in order to promote involvement for boys and girls in a cross-age, peer-assisted learning environment over a longer duration.

It was evident that the greatest determinant of the intervention's success was managing the school setting; the intention was therefore to develop a program that would limit its impact on the curriculum, timetable, and teachers. Investigating whether the intervention could potentially be integrated within existing programs was also necessary. The previously discussed barriers to implementing an intervention into the physical education curriculum (Chapter 3 & 4) and the previous success of stealth interventions to address public health outcomes determined where the intervention would be integrated. Therefore, a stealth approach was undertaken where one outcome is primarily promoted but additional benefits are also sought. Within the school setting the existing transition program, similar to that conducted in most schools for new Year 7 students as they enter into secondary school, provided the most appropriate setting.

This chapter compares the effects of such a stealth intervention on the primary outcomes of Year 7 school connectedness whilst providing opportunities to increase physical activity and

self-efficacy in physical activity. In addition, changes were also examined to Year 10 peer leaders' leadership self-efficacy and their physical activity self-efficacy.

6.2 Introduction

Schools have been identified as key health settings [76]. However, with opportunities for physical education and physical activity declining in schools [29] and the complex array of barriers that present themselves to physical education teachers [48], sustainable school-based health, physical activity and leadership interventions are becoming increasingly difficult to implement [37, 38, 61, 75].

Stealth interventions that promote one outcome but are enacted for additional reasons have gained recent popularity, particularly with obesity interventions aligned to public health policy [66, 67]. Their use in schools is somewhat unknown. Disguising the aim of promoting physical activity within an intervention with a different focus may be an astute approach particularly as the mere offering of physical activity and physical education opportunities for students may not engage, excite or encourage participation and offerings have even been found to alienate students [140]. The transition of students from primary to secondary school, a time of pivotal change in adolescents' personal, social and cognitive development [49], may provide an opportunity for such a stealth intervention to be implemented.

The transition between primary and secondary school is underpinned by adolescents having both positive [68, 69] and negative experiences [45, 70, 181, 182]. To support adolescents during this period, programs such as peer support, peer mentoring and peer tutoring have been commonly used in Australian schools and internationally for some time [49]; the process is often referred to as peer-assisted learning (PAL). The aim of such programs is to provide a 'buddy' or 'tutor' system in which students, of the same-age or cross-age assist other students to adapt to their new school environment. Mentoring/tutoring can be effective

in a range of different contexts [59], including those involving physical activity and physical education [50, 183]. Positive outcomes including changes to self-efficacy are also possible for both peer leaders and tutees and have been reported in the general classroom, physical education classes and community programs [50, 60, 61, 64, 183, 184].

The aim of many school transition programs is to promote a sense of school connectedness, such as liking school, having a sense of belonging, developing positive relationships or bonds [72]. With previous research reporting that the transition period is susceptible to declines in sport competency beliefs and participation [45, 70, 74, 185], using physical activity during this transition time may potentially have the capacity to impact on a range of outcomes. Exploring multiple variables in transition programs may be particularly important since participation in extra-curricular activities involving physical activity have been found to positively influence school connectedness [71, 186-188].

There is a scarcity of school connectedness research specifically during the transition period from primary to secondary school both in Australia and internationally. Previous studies focusing on this period have assessed changes in student academic performance, and behavioural changes relevant to declines in levels of motivation, interest, self-efficacy, self-esteem and increases in problem or risk-taking behaviours [69, 181, 189-194].

In addition to filling this paucity of school transition research the aim of the GLAMA (Girls! Lead! Achieve! Mentor! Activate!) and BLAST (Boys! Lead! Activate! Succeed Together!) programs was to investigate the effectiveness of an 8-week peer leadership, school connectedness and physical activity intervention. More specifically, this study assessed changes to the primary outcomes of leadership self-efficacy (Year 10; ages 15-16 years old) and school connectedness (Year 7; ages 12-13 year old). Secondary outcomes for Year 10 students included the assessment of changes in general self-efficacy, physical activity self-efficacy (PASE), and physical activity and psychosocial health (PedsQL). The evaluation of

secondary outcomes for Year 7 students included their experiences of bullying, social connectedness, social self-efficacy, and physical activity self-efficacy (PASE) after the completion of the GLAMA and BLAST program.

The contrasting associations reported between participation in extra-curricular activities increasing school connectedness and the transition period leading to decreases in sport participation, competency, general self-efficacy and self-esteem lead to the following hypotheses:

1. Year 7 participants in the intervention school will maintain their level of school connectedness in comparison to a decline in the control school.
2. Year 7 participants in the intervention school will improve physical activity-self efficacy in contrast to a decline in the control school.

Furthermore, as Year 10 peer leaders would be given opportunities to take on a range of leadership responsibilities it was hypothesised that:

1. Year 10 peer leaders will experience a greater increase in leadership self-efficacy than Year 10 students from the control school.
2. Physical activity self-efficacy of both the Year 10 peer leaders and Year 10 control group will not change.

6.3 Methods

6.3.1 Schools and participants

Two metropolitan state secondary schools from Victoria, Australia were invited to participate in the study. Schools were matched using the Schools and Family Occupation (SFO) index used by the State Department of Education (DEECD) [195]. Along with two thirds of the state secondary school population that are ranked between low and medium, the schools in this

study were ranked low. This ranking of “low” indicates that the schools needs are not high and as such are not particularly disadvantaged but are largely representative of state school populations. Eligible participants were Year 10 and Year 7 students. One school acted as the intervention school, whilst the other was the control school and did not receive the GLAMA or BLAST intervention. Both schools completed the same baseline and post-testing. Schools were not randomly allocated due to the difficulty in working within a school environment; both the intervention and control school required that if the program was to be administered it must be done so for all Year 7 students as it was a “timetabled” during class time. The difficulty then extends to the alternative of placing a randomised controlled trial within the same school as this could possibly lend itself to high levels of contamination across the groups.

6.3.2 Study approval

This intervention study was registered with the Australia and New Zealand Clinical Trials registry (ACTRN12611000105943). Ethical approval was obtained from the RMIT University Human Ethics Committee and the Victorian Department of Education and Early Childhood (DEECD). Participants and their parents provided written informed consent. The study was conducted between November 2010 and May 2011.

6.3.3 Intervention

Bandura’s Social Cognitive Theory [43] underpinned the theoretical framework of the intervention. Previous findings identifying the barriers to implementing physical education and physical activity in schools [48], including the difficulty teachers had engaging students and the perception that peer pressure was an influential factor in students’ choice to participate also guided this research. In considering the aforementioned findings, and the potential for peer-assisted learning in school-based physical education interventions [48], the rationale for the foundation of the GLAMA and BLAST intervention was formed.

The GLAMA and BLAST school-based intervention included two days of leadership training (Figure 6.1). Following this, same gender (where possible) peer leaders were allocated to one of the Year 7 groups, arbitrarily compiled by the school at the start of the year by the staff member who coordinated Year 7 students.

The first introduction of leaders to Year 7 students occurred at Year 7 school camp. This was followed by the school-based implementation of seven GLAMA and BLAST peer leadership and physical activity sessions during class time (48 minutes duration) (Figure 6.1). The length of the program was dictated by the school. The first term of the school year was 11-weeks in duration. The intervention commenced in week three and was completed by the end of term one. Subsequently there were eight available weeks to conduct the intervention. Week two, was not completed due to unforeseen disruptions to the school program which were outside the researcher's control. Consequently, a total of seven sessions were conducted over the eight week period. Recruitment flow and the structure of each session are outlined in Figure 6.1. The activities used in the program were guided by an 'Adventure Racing' concept [167] and have been reported previously [196].

6.3.4 Year 10 peer leaders

The intervention training program focused on the development of leadership skills to enable Year 10 peer leaders to successfully lead a team of four to six Year 7 students in a range of cognitive, affective and physical activity tasks. Recruitment included making the opportunity available to all Year 10 students and potential leaders completing written applications. Suitable leaders were then selected by two teachers at the school (n=54). A two day training course was conducted in November, 2010 based on the 'train the trainer' model [172, 173]. Training involved both practical and theoretical components and was led by the researcher and teachers. Training focused on providing question and answer sessions, partner activities, modification techniques, brainstorming and group discussions.

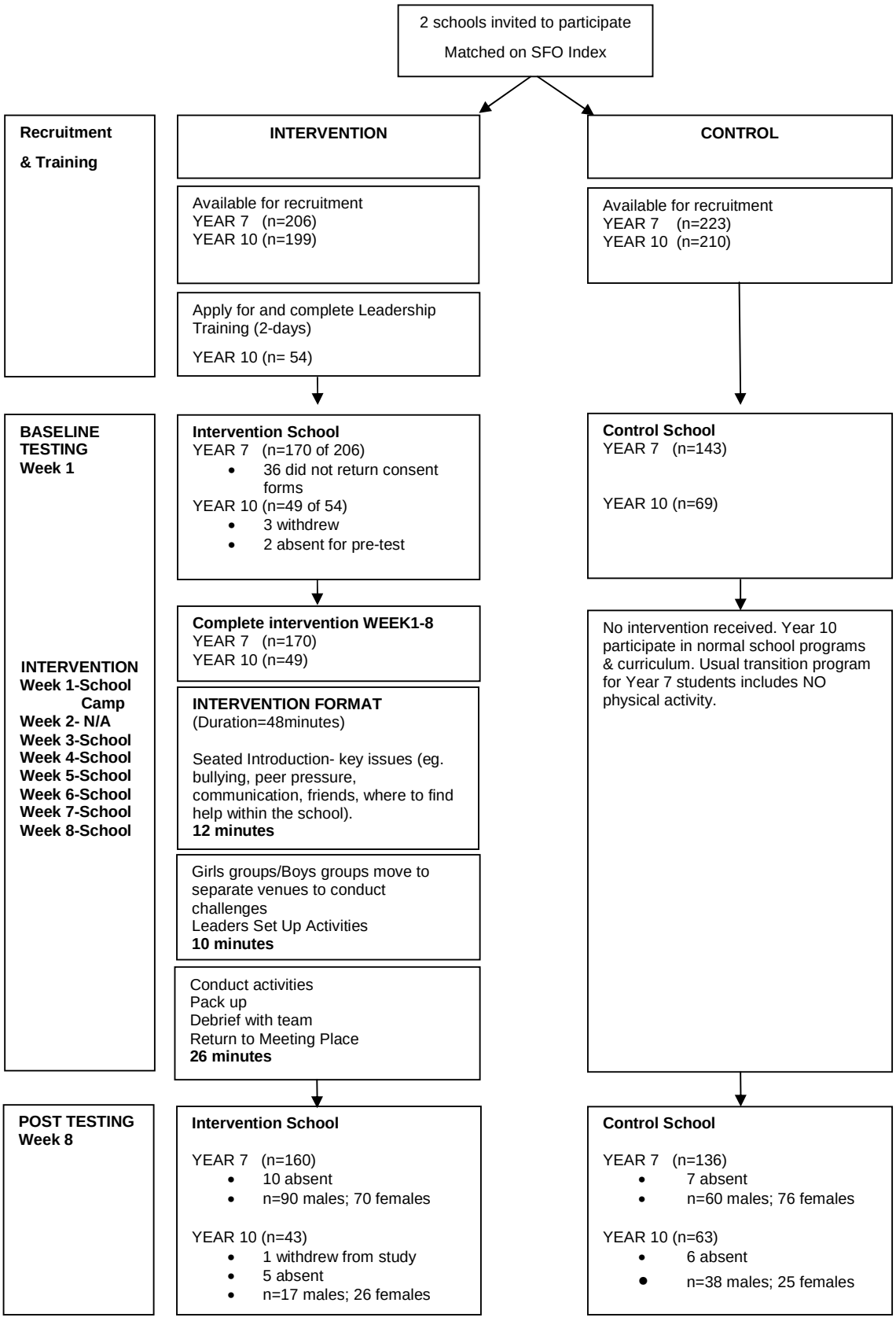


FIGURE 6.1: Participant recruitment, intervention format and data collection

Leaders also participated in each of the physical activities they were to lead. The following five key areas were addressed: understanding and developing leadership characteristics, developing communication skills, developing management skills to lead their group appropriately, behaviour and motivation with role-modelling of both the leader and Year 7 participant responsibilities.

At school camp, peer leaders implemented their first session, including an extended introduction of 20 minutes focusing on 'getting to know you' activities as well as a GLAMA and BLAST physical activity session. The introduction topics implemented at the start of each session included those requested by the school (Figure 6.1). The topic areas were similar to many others conducted in peer support programs in Australian schools [49].

The remaining sessions were school-based. The Year 10 peer leaders were given a GLAMA and BLAST timetable and were released from their individual classes to conduct the program for the duration of the term. The onus was on peer leaders to ensure they attended the correct sessions, informed their classroom teacher of absences and caught up on work missed in class.

6.3.5 Year 7 BLAST & GLAMA participants

After the initial camp introduction, boys and girls participated in each GLAMA and BLAST session in separate areas within the school; activities were conducted in a range of indoor or outdoor environments. At least two Year 7 classes were simultaneously released from timetabled classes to participate in the program. This ensured a mixture of teams across classes with each gender group having approximately 25 students. All Year 7 students at the intervention school (n=206) participated in the program. The school supported the intervention implementation and data were only collected from Year 7 students who returned dual consent forms (n=170) (Figure 6.1).

6.3.6 Control school participants

Year 10 participants in the control school completed their regular school program and curriculum, undertaking no leadership or training programs within the intervention period. The Year 7 students at the control school received their regular curriculum and school transition program, which did not include any physical activity components. The majority of schools offer some type of transition program to facilitate the change in learning and social environments when students move from primary school (Year 6) to secondary school (Year 7).

6.3.7 Outcome measures

The questionnaires were distributed by the researcher and teachers involved with the program using a standardised protocol. Data were collected at both the control and intervention schools using previously validated questionnaires at similar time points (baseline and post-intervention).

Primary outcomes

School connectedness (Year 7)

School connectedness was measured via a previously validated questionnaire with high internal consistency (Cronbach α=0.87) [197]. Twenty-seven questions were grouped into four sub-categories that together formed a school connectedness score: participation, relationships, belonging and commitment. A validated four-point scale (YES!, Yes, No, NO!) was used to define agreement with statements.

Leadership self-efficacy (Year 10)

Leadership self-efficacy was measured using a previously validated questionnaire (Cronbach α=0.69) [61]. Ten questions were adapted to be gender inclusive as they were

previously used in a female only study [61]. A five-point scale defined levels of agreement to statements (1=disagree a lot, disagree a little, neither agree nor disagree, agree a little, 5=agree a lot). A leadership self-efficacy score was calculated out of 50 [61].

Secondary outcomes

Social self-efficacy, social connectedness, bullying (Year 7)

Social connectedness (Cronbach α=0.69) and social self-efficacy were also measured using the same previously validated questionnaire that measured school connectedness [197, 198]. The assessment of social self-efficacy included a four-point scale (1=very bad, poor, good, 4=very good) with 15 questions pertaining to self-efficacy within a range of social contexts. Social connectedness was measured by seven questions assessing access to and confidence in friendship groups. The responses of 'good and very good' were dichotomised as good social connectedness in contrast to 'poor and very bad' social connectedness. Bullying was measured using a validated questionnaire of four questions [198]. Participants were classified as bullied if they answered affirmatively to any of the four items addressing victimisation in the last month: being teased, having rumours spread about them, being deliberately excluded or experiencing physical threats or violence.

Physical activity self-efficacy (PASE) (Year 10 & 7)

A five-point scale assessed responses to two types of PASE questions; self-management and social support. A total and mean score were calculated by summing all values (1 through 5) then dividing by the total number of questions (8). The scale reliability and validity are well documented in previous studies [199].

Physical activity and stages of change (Year 7)

The Transtheoretical Model (TTM) has been commonly used in physical activity assessment and interventions with adolescents [73, 200]. Information relevant to the number of days per week spent in physical activity exceeding 60 minutes were collected. In addition the duration of habitual participation and intention to change participation were also investigated [73, 200]. A total number of three questions formed this component of the questionnaire. Students failing to provide the number of days were removed from the data set (n=28), leaving a total of 270 respondents.

General self-efficacy (Year 10)

A total of 10 questions determined general self-efficacy. A four-point response scale was used (1=not at all true, hardly true, moderately true, 4=exactly true). Responses were summed for all 10 items to yield a final composite score with a range from 10-40 points. Previously validated, samples from 23 nations reported Cronbach alpha's ranging from α=0.76 to α=0.90 [201].

Pediatric Quality of Life Inventory (PedsQL) (Year 10)

The PedsQL questionnaire included 15 questions, responses to which were then calculated to provide four scores pertaining to adolescent emotional, physical, social and school functioning. A five-point scale defined difficulties students encountered over the past month (0=Never, Almost Never, Sometimes, Often, 4=Almost Always)[202]. Scale items were recalculated to 0, 25, 50, 75 or 100 and then mean scores calculated from the total number of items answered. The overall PedsQL physical activity health score and psychosocial health score (combination of emotional, social and school functioning) is a score out of 100. Data sets that were incomplete or missing more than 50% of the data were excluded leaving a total of 102 respondents. Strong evidence supports the PedsQL instrument as a valid, reliable and sensitive tool to measure health in school populations [202].

6.3.8 Data analysis

Data were analysed using PASW Statistics, Version 19 (IBM SPSS, Chicago, IL). Preliminary analyses were performed to ensure there were no violation of assumptions and data were visually and statistically inspected for normality and summarised as means (SD). Reliability was measured by Cronbach alpha as appropriate. Independent t-tests were used to compare differences between intervention and control groups at baseline. The group means were compared at baseline and change scores were calculated post-pre for all outcome variables and presented using 95% confidence intervals.

The study was a controlled (intervention school vs control school) before and after design with the group-by-time, time and group effects for the primary and secondary outcomes investigated with general linear model (GLM) repeated measures analysis. The magnitude of the differences between groups for each outcome measure were interpreted using effect size [202]. Effect sizes were defined as small (d=0.2), moderate (d=0.5) and large (d=0.8) respectively [203].

Sample size were calculated for the primary outcome Year 7 School connectedness in the absence of previous reports of school connectedness as a continuous outcome variable [203]. It was predicted that a total number of 130 participants per school would permit detection of a mean between participant change from baseline of 0.35 standard deviation and would be significant at the 0.05 level with a power of 80% [204]. For the Year 10 primary outcome, leadership self-efficacy was also calculated in the absence of reported continuous data. However, given that changes have been observed in other contexts with adolescents over a longer period of time, it was conservatively predicted that a total number of 50 participants per school would allow us to demonstrate that a mean between participant change from baseline of 0.6 standard deviation would be significant at the 0.05 level with a power of 80% [204].

All variables significantly related to explaining variance in the primary outcomes during univariate regression analysis were considered for inclusion in independent and stepwise multiple regression models. Regression models were used to investigate the overall (multiple regression) and independent (stepwise) contributions to the variance of change in school connectedness (Year 7) and leadership self-efficacy (Year 10) from among the potential predictive variables identified. The change (post minus baseline) in school connectedness (Year 7) or leadership self-efficacy (Year 10) was the dependent variable. Gender and school were investigated as covariates for regression analysis. Colinearity was defined as having a correlation of >0.7 and <0.1 coefficient tolerance ($1\text{-}R^2$). Colinearity checks were used to assess which variables could be included together in the same multiple regression models. A two-tailed p-value of <0.05 was accepted as statistically significant.

6.4 Results

The Year 10 outcome measures had moderate internal reliability in this study, similar to previous research [61, 199, 201]; leadership self-efficacy (Cronbach α=0.73), general self-efficacy (Cronbach α=0.75) and PASE (Cronbach α=0.75). In contrast, at Year 7 level, PASE reliability was higher (Cronbach α=0.86). The reliability of the Year 7 primary outcome for school connectedness was α=0.90 in this study and the social self-efficacy (Cronbach α =0.85) and social connectedness (Cronbach α =0.90) components of the questionnaire also had strong internal reliability and were similar to previous studies [197]. Data collection timeframes and participant flow are presented in Figure 6.1.

6.4.1 Year 7 primary outcome- School connectedness

Despite being matched on the Schools and Family Occupation (SFO) indices, at baseline there were significant differences (t=(311)=-2.80, p=0.05) in school connectedness scores between the intervention ($\bar{x}$ =94.67, SD=7.99) and the control school ($\bar{x}$ =91.95, SD=7.89).

TABLE 6.1: Year 7 primary and secondary outcomes over the 8-week school-based intervention

Year 7	Control School n=136			Intervention School n=160								
Measured outcomes	**Pre**	**Post**	**x̄ ▲ within group**	**Pre**	**Post**	**x̄ ▲ within group**	**Time effect**	**Effect size**	**Group effect**	**Effect size**	**Group x time**	**Effect size**
	x̄ (sd)	**x̄ (sd)**	**(95% CI)**	**x̄ (sd)**	**x̄ (sd)**	**(95% CI)**	***p***	***d***	***p***	***d***	***p***	***d***
Primary Outcomes												
School connectedness (108)	94.67(7.99)*	92.45 (9.68)	-2.22(-3.95 to -0.49)	91.95(7.89)*	89.48(8.81)	-2.47(-4.06 to -0.87)	0.001***	0.05	0.001***	0.04	0.836	0.00
[a]*Relationships (36)*	31.63(3.49)	30.50(4.36)	-1.12(-1.88 to -0.36)	31.12(3.22)	29.54(3.74)	-1.58(-2.27 to -0.88)	0.001***	0.08	0.034*	0.01	0.384	0.00
[a]*Participation (24)*	21.36(1.87)***	20.90(2.11)	-0.46(-0.89 to -0.01)	20.51(2.14)***	19.90(2.22)	-0.61(-1.01 to -0.19)	0.001***	0.03	0.001***	0.07	0.624	0.00
[a]*Commitment (16)*	14.94(1.25)*	14.81(1.44)	-0.13(-0.42 to 0.17)	14.60(1.33)*	14.66(1.48)	0.06 (-0.22 to 0.33)	0.740	0.00	0.050*	0.01	0.382	0.00
[a]*Belonging (32)*	26.66(2.94)**	26.22(3.43)	-0.44(-1.10 to 0.22)	25.70(3.20)**	25.36(3.58)	-0.33(-0.95 to 0.27)	0.091	0.01	0.004**	0.02	0.821	0.00
Secondary Outcomes												
Physical activity self-efficacy (45)	30.59(6.09)***	30.90(6.88)	0.31(-0.48 to 1.10)	27.90(5.97)***	28.65(6.64)	0.75(0.24 to 1.48)	0.054	0.01	0.001***	0.04	0.419	0.00
Days of physical activity per week (7)	4.24(1.82)	4.26(1.71)	0.02 (4.01 to 4.48)	4.08 (1.83)	4.33 (1.70)	0.25 (3.98 to 4.42)	0.293	0.00	0.778	0.00	0.351	0.00
Social self-efficacy (5)	3.17(0.40)*	3.17(0.47)	0.00(-0.07 to 0.09)	3.05(0.39)*	3.09(0.41)	0.04(-0.03 to 0.11)	0.408	0.00	0.011*	0.02	0.607	0.00
Social connectedness (7)	6.16(0.96)	6.32(0.98)	0.15 (-0.36 to 0.05)	6.09(0.96)	6.13(1.0)	0.04(-0.15 to 0.22)	0.180	0.00	0.133	0.00	0.410	0.00

Note: [a] =subcategory of school connectedness; x̄ ▲=mean change; measured outcome (108)=maximum score possible; statistically significant differences = *p<0.05; **p<0.01; ***p<0.001; *d*=effect sizes, small=0.2, moderate =0.5, large=0.8).

Accordingly, three of the four sub-categories that comprised school connectedness also resulted in significant differences (Table 6.1).

School connectedness decreased significantly from baseline to post intervention in both the intervention and control schools, although the effect size was small ($F(1,294)=15.37$, $p<0.001$, $\eta_p^2=0.05$). However, both schools had relatively high school connectedness scores at both baseline and post intervention; with scores exceeding 89 of a possible 108. There were also significant differences between schools ($F(1,294)=12.491$, $p<0.001$, $\eta_p^2=0.04$) with the intervention school ($\bar{x}=89.48$, *SD=8.81*) having a lower school connectedness score than the control school ($\bar{x}=92.45$, *SD=9.68*) (Table 6.1).

The sub-categories of school connectedness were assessed for changes over the intervention period. There were significant decreases in *relationship* ($F(1,294)=26.79$, $p<0.001$, $\eta_p^2=0.08$) and *participation* scores ($F(1,294)=12.02$, $p<0.001$, $\eta_p^2=0.03$) over the 8-weeks for both schools; the *relationship* sub-category had a medium effect size (Table 6.1). In addition, significant group effects were found for both *relationship* ($F(1,294)=4.52$, $p=0.034$, $\eta_p^2=0.01$) and *participation* scores ($F(1,294)=23.26$, $p<0.001$, $\eta_p^2=0.07$) with a medium effect size. The control school's *relationship* (-1.12) and *participation* (-0.46) scores declined less in comparison to the intervention school. However, there were no group-by-time interactions. A significant group effect was observed for the sub-category of *commitment* ($F(1,294)=3.87$, $p=0.050$, $\eta_p^2=0.01$). Despite the absence of a group-by-time interaction, the intervention school improved (+0.06), and the control school scores decreased (-0.13). The *belonging* score decreased in both schools with a significant group effect but only a small effect size ($F(1,294)=8.60$, $p=0.004$, $\eta_p^2=0.02$). The control school decreased (-0.44) more than the intervention school (-0.33) however, there were no group-by-time interactions (Table 6.1).

Baseline predictors of change in school connectedness

We tested baseline characteristics for their ability to predict which Year 7 participants would improve school connectedness over the intervention period. Univariate analysis showed baseline social self-efficacy was the largest single predictor of the change in Year 7 school connectedness for the whole cohort ($r=0.257$, $p<0.001$) and the control school ($r=0.207$, $p=0.016$). In contrast, social connectedness was the largest single predictor for the intervention school ($r=0.315$, $p<0.001$) with social self-efficacy a similar predictor ($r=0.313$, $p<0.001$) (Table 6.2).

In the multiple regression model for the entire Year 7 cohort, baseline social self-efficacy, social connectedness, and bullying experiences accounted for only 7.0% of the variance in change in school connectedness ($r=0.303$, $p<0.001$). Gender was controlled for and explained only 1.0% of variance despite a significant univariate value ($r=0.116$, $p=0.047$). In the stepwise multiple regression model, including gender as a covariate; 6.4% of variance in change in school connectedness was attributable to baseline social self-efficacy and bullying experiences ($r=0.289$, $p<0.001$).

The control school had only one independent and significant baseline predictor of change in school connectedness; social self-efficacy ($r=0.207$, $p=0.016$). In contrast, the multiple regression model found a total of 12.8% of the variance in change in school connectedness in the intervention school was determined by social self-efficacy, social connectedness, bullying and PASE ($r=0.394$; $p=0.001$), with gender accounting for only 0.08% of this variance ($r=0.120$, $p=0.133$). However, in the stepwise regression model, when gender was controlled for, baseline social self-efficacy and social connectedness remained as the only significant predictors of change in school connectedness for those in the intervention school ($r=0.365$; $p=0.001$), explaining 11.6% of the variance.

Changes over time: Predictors of change in school connectedness

Potential mediators associated with changes in school connectedness over time were investigated across the whole cohort (Table 6.2). The change in school connectedness was the greatest in those who improved social self-efficacy, social connectedness and PASE (Table 6.2). In the whole Year 7 cohort, the multiple and stepwise regression models found the change in social self-efficacy, change in social connectedness, and change in PASE were the significant predictors of school connectedness (r=0.550, p<0.001), accounting for 29.3% of the variance, including only 1% explained by gender (r=0.116, p=0.047).

TABLE 6.2: Baseline and change factors associated with Year 7 change in school Connectedness

YEAR 7	**Whole school Cohort (n=296)**		**Intervention school (n=160)**		**Control school (n=136)**	
Baseline variable	***r***	***p***	***r***	***p***	***r***	***p***
Social self-efficacy	0.257	0.001***	0.313	0.001***	0.207	0.016*
Social connectedness	0.229	0.001***	0.315	0.001***	0.123	0.152
PASE	0.070	0.229	0.198	0.013*	0.061	0.479
Bullying	0.167	0.004**	0.237	0.003**	0.083	0.339
Change variable						
▲Social self-efficacy	0.520	0.001***	0.629	0.001***	0.410	0.001***
▲Social connectedness	0.324	0.001***	0.446	0.001***	0.168	0.051
▲PASE	0.194	0.001***	0.249	0.002**	0.130	0.131
▲Bullying	0.012	0.841	0.046	0.564	0.096	0.265
Gender	0.116	0.047*	0.120	0.131	0.117	0.177
School	0.012	0.836				

Note: ▲Change variable= change over time (post-pre); PASE= physical activity self-efficacy; Dependent variable= change in school connectedness score; significant univariate predictor= *p<0.05; **p<0.01; ***p<0.001

In the intervention school, the multiple and stepwise regression model found a total of 43.7% of change in school connectedness could be predicted by change in social self-efficacy, social connectedness, and PASE (r=0.671, p<0.001). In the control school, change in social self-efficacy was the only significant predictor of change in school connectedness (Table 6.2).

6.4.2 Year 7 secondary outcomes

Physical activity self-efficacy

Physical activity self-efficacy increased in both schools over the intervention period (F(1,294)=3.747, p=0.054, η_p^2=0.01) (Table 6.1). There were also significant group effects supported by a large effect size (F(1,294)=12.76, p<0.001, η_p^2=0.41). The intervention school improved more (+0.75) than the control school (+0.31), however these were not significant group-by-time changes and there were significant differences at baseline between schools (t=(311)=-3.813, p<0.001) (Table 6.1). There were significant group effects for social self-efficacy (F(1,294)=6.534, p=0.011, η_p^2=0.02); with no change in the control school and an increase in the intervention school. There were small non-significant improvements in both schools for social connectedness (Table 6.1).

Days per week of physical activity

There were no significant school, group-by-time or time effects for the self-reported number of days of completing 60 minutes of physical activity (Table 6.1). Overall, 40% of Year 7 students reported their participation in days per week of physical activity decreased over the 8-week period. A total of 29% remained the same and 31% reported they had improved their physical activity. Therefore, 60% of students either maintained or improved their physical activity participation. In the intervention school, there was a mean increase in days per week reported from baseline to post intervention (+0.25). There were also small increases in the control school (+0.02). A total of 31.5% of males reported an increase in days per week

participating in physical activity in the intervention school, similar to 30% in the control school. In both schools, 40% of females reported decreased physical activity during the intervention period. Females in both the intervention (26%) and control (36%) schools reported increases in their number of days of physical activity. Therefore, 60% of females in both the intervention and control school maintained or improved their physical activity participation.

Bullying experiences

A total of 248 of 302 (82%) Year 7 students were not experiencing any form of bullying at the commencement of the intervention period, one month into the school year. After the intervention period, direct or indirect bullying increased to 23% of students who were experiencing bullying. There were no significant group-by-time interactions with negligible differences in the intervention school, male incidences increased 1% to give a total of 28%; female incidences decreased 1% to give a total of 22%. In contrast, in the control school bullying increased 9% to give a total of 30% in males; and in females there was a 9.3% increase from baseline to give a total of 19.3% reporting being bullied.

6.4.3 Year 10 primary outcome- Leadership self-efficacy

At baseline, leadership self-efficacy ($t(114)=4.03$, $p<0.001$) was significantly different between the control and intervention school (Table 6.3). Over the intervention, there were no group-by-time effects ($F(1,104)=1.250$, $p=0.266$, $\eta_p^2=0.01$) for leadership self-efficacy. However, there were significant group effects ($F(1,104)=13.26$, $p<0.001$, $\eta_p^2=0.11$) supported by a large effect size. Leadership self-efficacy increased for both the intervention group (+0.11) and control group (+0.92) during the intervention period (Table 6.3).

TABLE 6.3: Year 10 primary and secondary outcomes over the 8-week school-based intervention

Year 10	Control School n =63			Intervention School n=43								
Measured Outcomes	**Pre**	**Post**	**x̄ ▲ within group**	**Pre**	**Post**	**x̄ ▲ within group**	**Time effect**	**Effect size**	**Group effect**	**Effect size**	**Group x time**	**Effect size**
	x̄ (sd)	**x̄ (sd)**	**(95% CI)**	**x̄ (sd)**	**x̄ (sd)**	**(95% CI)**	***p***	***d***	***p***	***d***	***p***	***d***
Primary Outcome												
Leadership self-efficacy (50)	37.09(4.56)***	38.01(4.97)	0.92 (-0.25 to 2.09)	40.67 (5.81)***	40.79(4.73)	0.11 (-1.30 to 1.53)	0.266	0.012	0.001***	0.113	0.388	0.007
Secondary Outcomes												
General self-efficacy (40)	31.52 (3.00)	33.03 (2.98)	1.51 (0.58 to 2.43)	32.46 (4.06)	32.95 (3.66)	0.49 (-0.63 to 1.61)	0.008**	0.066	0.441	0.006	0.168	0.018
Physical activity self-efficacy (5)	3.52 (0.67)	3.64(0.68)	0.12 (-0.00 to 0.23)	3.77 (0.65)	3.97 (0.68)	0.20 (0.58 to 0.34)	0.001***	0.100	0.023*	0.048	0.372	0.008
PEDSQL- physical activity health (100)	87.77(13.31)	88.25 (12.98)	0.48 (-2.42 to 3.37)	89.61(14.29)	90.38(10.34)	0.77 (-2.91 to 4.45)	0.599	0.003	0.400	0.007	0.902	0.001
PEDSQL- psychosocial health (100)	77.73(14.15)	77.77(14.16)	0.04 (-2.73 to 2.81)	80.06(14.62)	77.94 (9.94)	-2.12 (-5.64 to 1.42)	0.361	0.008	0.621	0.002	0.343	0.009

Note: x̄ ▲=mean change; measured outcome (50)=maximum score possible; statistically significant differences = *p<0.05; **p<0.01; ***p<0.001; *d*=effect sizes, small=0.2, moderate =0.5, large=0.8).

Year 10 baseline predictors of change in leadership self-efficacy

We tested baseline characteristics for their ability to predict change in Year 10 leadership self-efficacy. Univariate analysis determined that baseline general self-efficacy was the only significant predictor of change in leadership self-efficacy for the entire Year 10 cohort (r=0.221, p=0.025) (Table 6.4). Year 10 males had both baseline general self-efficacy (r=0.335, p=0.012) and baseline PASE (r=0.296, p=0.028) as the significant predictors of change in leadership self-efficacy. The multiple regression model including these predictors only accounted for 13.2% of the variance in change in leadership self-efficacy (r=0.405, p=0.009). However, the stepwise regression model found general self-efficacy was the only independent and significant predictor of change in leadership self-efficacy (r=0.335, p=0.012).

Uniquely, Year 10 females change in leadership self-efficacy was predicted by baseline PASE (r=0.280, p=0.046) and psychosocial health (r=0.313, p=0.028; Table 6.4). However, the multiple regression model including both these variables identified they only contributed 11.9% of the variance in change in leadership self-efficacy(r=0.395, p=0.020). Stepwise regression only retained baseline psychosocial health as the greatest independent and significant predictor of change in leadership self-efficacy in Year 10 females (r=0.313, p=0.028), explaining 7.9% of the variance.

Year 10 changes over time: Predictors of change in leadership self-efficacy

Change in general self-efficacy was the only significant predictor of change in leadership self-efficacy for the whole cohort (r=0.361, p=0.001), the intervention school (p=0.471, p=0.002), and Year 10 males (r=0.447, p<0.001) (Table 6.4). The control school and Year 10 females did not have any significant predictors of change in leadership self-efficacy.

6.4.4 Year 10 secondary outcomes

At baseline, there were no significant differences between the intervention and control school for general self-efficacy, physical activity self-efficacy, and both PEDSQL physical activity and psychosocial health scores (Table 6.3). At the conclusion of the 8-week intervention there were significant time-effects with a moderate effect size for physical activity self-efficacy ($F(1,104)=11.61$, $p<0.001$, $\eta_p^2=0.10$), with both schools improving their PASE. A significant group effect ($F(1,104)=5.30$, $p=0.023$, $\eta_p^2=0.04$) showed Year 10 peer leaders (+0.20) improved their PASE more than the Year 10 students in the control school (+0.12), without a significant group-by-time effect.

There were also significant time-effects with a medium effect size for general self-efficacy ($F(1,104)=7.38$, $p=0.008$, $\eta_p^2=0.06$; Table 6.3). Both students in the control (+1.51) and intervention schools (+0.49) improved their general self-efficacy, however there were no significant differences between groups.

The only decline experienced by the peer leaders in the intervention group was on the PEDSQL psychosocial measure (-2.12), whereas the control group slightly improved this measure (+0.04). However, this measure was still higher than the control group at both baseline and post intervention. All other outcome measures increased for both schools (Table 6.3).

TABLE 6.4: Baseline and change factors associated with Year 10 change in leadership self-efficacy

YEAR 10	Whole school cohort (n=106)		Intervention school (n=43)		Control school (n=63)		Males (n=55)		Females (n=51)	
Baseline characteristic	***r***	***p***	***r***	***p***	***r***	***p***	***r***	***p***	***r***	***p***
General self-efficacy	0.221	0.025*	0.270	0.096	0.131	0.306	0.335	0.012*	0.006	0.967
PASE	0.032	0.746	0.034	0.837	0.006	0.964	0.296	0.028*	0.280	0.046*
PedsQL physical health	0.017	0.862	0.100	0.545	0.066	0.606	0.168	0.228	0.264	0.066
PedsQL psychosocial health	0.036	0.722	0.006	0.969	0.088	0.495	0.313	0.122	0.313	0.028*
Change variable										
▲General self-efficacy	0.361	0.001***	0.471	0.002**	0.144	0.260	0.447	0.001***	0.084	0.195
▲PASE	0.109	0.274	0.146	0.376	0.088	0.495	0.110	0.424	0.131	0.359
▲PedsQL physical health	0.049	0.622	0.047	0.775	0.141	0.271	0.037	0.792	0.039	0.793
▲PedsQL psychosocial health	0.079	0.430	0.072	0.661	0.081	0.529	0.163	0.244	0.092	0.530
Gender	0.125	0.209	0.310	0.055	0.019	0.833				
School	0.084	0.401					0.274	0.043*	0.054	0.705

Note: ▲change variable= change over time (post-pre); PASE= physical activity self-efficacy; PedsQL= Pediatric Quality of Life Questionnaire (Varni et al. 2006); dependent variable= change in leadership self-efficacy; significant univariate predictor=*p<0.05; **p<0.01; ***p<0.001

6.5 Discussion

This study reports the effect of the 8-week school-based GLAMA and BLAST peer leadership and school connectedness intervention. This is the first time to the author's knowledge that a stealth intervention aiming to provide physical activity opportunities and develop physical activity self-efficacy (PASE), in addition to the primary outcomes of school connectedness and leadership self-efficacy has been conducted during a primary to secondary school transition program.

6.5.1 Year 7 primary outcome: School connectedness

There was a significant decline in school connectedness for all Year 7 students thus refuting the hypothesis. However, both schools had high levels of school connectedness at the commencement of the study and therefore provided limited opportunity to increase school connectedness because students perceived that they were already relatively well connected. Many studies focusing on the transition period from primary to secondary school have assessed changes in student academic performance, and behavioural changes to motivation, interest, self-efficacy, self-esteem and problem or risk taking behaviours [69, 181, 189-194]. More specifically, research amongst similar age groups in the United States has shown that most primary school students feel connected to their school, followed by school connectedness, as measured by a variety of constructs, usually declining in middle to upper school levels [72, 187, 205, 206]. Declines across many outcomes during schooling years have been attributed to an inadequate fit between the environment and the developmental needs of students [207-209]. Students usually endeavour to start their first secondary school experience enthusiastically, wanting to do well, please others including peers and teachers and establish relationships [45, 68]. Over the duration, as this jostling for peer group approval and position within the hierarchical order is established, as the school year progresses students are more willing to test boundaries, change relationships and are provided with opportunities to disconnect via increasing adolescent peer pressure and possibly bullying [182].

As school connectedness declined for all students in both the control and intervention schools, understanding each of the four subcategories may provide some further insight. More specifically, school connectedness is considered to be largely dependent on three environmental conditions: academic success, support from the school and safe school environments [210]. The analysis of the *relationship* sub-category shows that over time, the establishment and maintenance of relationships with peers, teachers and others within schools changed significantly over the 8-week period for all students. There was a greater decrease in the intervention school, albeit small and not a significant group-by-time effect. Future research should consider investigating if independent of the intervention there were substantial changes or uncertainty surrounding the relationships formed, or opportunities were lacking for establishing or maintaining relationships. Relationships may be a key indicator of school connectedness, with previous findings that students who come to a school with friendship groups already established, or who are quick to develop positive teacher-student relationships and participate in extra-curricular activities (usually with peers) have greater school connectedness [71, 186, 188, 211, 212]. The development of relationships with peers and teachers when entering school is imperative to successful adaptation to the new school environment, and provides opportunity for greater school connectedness [72, 185, 211, 213]. It appears that both schools needed to provide further opportunities for students to enhance their relationships during this transition period therefore, contact more than once a week as part of the GLAMA and BLAST intervention, may be needed to assist development in this area.

Evidence from this study indicates that Year 7 students perceived that the availability of and ability to participate and assist in a range of activities in both schools declined significantly over 8-weeks as represented by the *participation* sub-category. This overall decline may be attributable to a lack of knowledge regarding the programs that are available within the new school environment. The significant difference between schools is of interest, as both schools still had quite high *participation* scores. If students have difficulty forming and maintaining relationships in the intervention school, their participation and willingness to

assist teachers and peers in activities may be affected. Students need to feel supported and think of themselves as valuable contributors to a school community; one that is physically and emotionally safe [213]. Therefore, social support via peers to participate in activities is usually required.

In this study, the changes in social self-efficacy, social connectedness and PASE over the duration of intervention were the strongest predictors of change in school connectedness. Social connectedness remained unchanged between schools over time. However, there were significant differences between schools for social self-efficacy with improvements recorded in the intervention school and no change in the control school. This school difference may be attributable to all schools running their own unique transition programs at the start of the school year and the type of transition program being implemented. The GLAMA and BLAST program with the physical activity component may have provided more opportunity to socially interact within their own groups but also with other groups and this may contribute to those within the intervention school perceiving a higher ability to socially adapt to a range of different contexts in and outside the school, with different people including their peers, possibly peer-leaders and teachers. However, this is an area that requires further investigation.

6.5.2 Year 7 secondary outcomes

Physical activity self-efficacy

Despite the absence of group-by-time changes for PASE, the study found trends toward significant improvements in Year 7 PASE over the 8-week intervention period; thus optimistically, partial support of the hypothesis may be found. A total of 40% of Year 7 students reported their participation in physical activity decreased over the 8-weeks; in contrast to 60% of Year 7 students who either maintained or improved their activity participation. These findings are in direct contrast to previous research suggesting physical activity participation declines during adolescence particularly for girls [47, 178, 214].

Furthermore, declines across the transition period and reductions in physical activity self-efficacy have previously been reported [38, 70, 153, 161, 214]. However, longer monitoring of physical activity into the winter months and a more prolonged observation period may have resulted in different trends, similar to those of other studies.

These trends towards significant time-effects for Year 7 students' PASE may possibly be attributed to a greater access to new activities in the school curriculum as opposed to their primary school experiences. Additionally, being more socially connected and having associations with a diverse range of people within the school community becomes extremely important to adolescents [188, 197]. This potential friendship group expansion may facilitate opportunities to engage in more physical activity in organised group activities or sports due to this changing social dynamic. Social and peer support has previously been found to be a key determinant of physical activity participation and PASE [152, 215]. The significant difference between schools PASE is harder to explain. During the 8-weeks, PASE in the intervention school increased over twice that of the control school, although the control school still had higher overall PASE. With almost identical curriculum opportunities available in both sport and physical education classes; the physical activity component of the GLAMA and BLAST program may have had some influence on the school differences and warrants further investigation over a longer timeframe as no group-by-time changes were identified.

Bullying experiences

The increase in bullying experiences was underpinned largely by the increase of nearly 10% of both male and female bullying incidences reported in the control school. In contrast, changes in the intervention school were negligible. Participants were classified as bullied if they answered affirmatively to any of the following occurring in the last month: being teased, having rumours spread about them, being deliberately excluded or experiencing physical threats or violence [198]. There is a strong potential for bullying to increase over this

transition period from primary to secondary school [182]. The impact of bullying particularly on the relationships formed and maintained by students over this transition period could explain the aforementioned significant school changes to the sub-categories of *relationships, belonging and participation*. As students jockey for position within the new social structure of the school, rates of bullying will increase after the initial transition period and then decrease with bullying occurring more frequently among boys than girls, peaking either side of transition and reducing in later years of schooling [182, 216]. Indeed, the shuffling and negotiation of peer relationships during transition may contribute to bullying [217]. Alternatively, the transition may be an opportunity for some students to establish new friends, shed previous social roles and develop new identities [218]. In summary, despite previous research identifying a clear link between bullying, harassment, violence and declining levels of school connectedness [219-221], change in bullying was not a significant predictor of change in school connectedness in this study.

6.5.3 Year 10 primary outcome: Leadership self-efficacy

Leadership self-efficacy did not change significantly in the intervention school. However, there were significant differences between schools for leadership self-efficacy. The Year 10 peer leaders maintained the highest baseline and post intervention leadership self-efficacy score however, a greater increase in the control school was observed. This refutes the hypothesis that Year 10 peer leaders would experience a greater increase in leadership self-efficacy than Year 10 students from the control school. A selection bias in leaders could have contributed to the school difference, particularly as the peer leaders were already identified and selected for leadership roles. In contrast, Year 10 students in the control school were not selected nor did they undertake any leadership positions within the school. Furthermore, the school differences may have been attributed to students being exposed to different teaching methods or development programs in junior levels of schooling. However, this is difficult to assess without an analysis of individual pathways through primary and secondary school which is extremely difficult within a dynamic school environment.

Opportunities to experience junior leadership roles or even develop key skills used when working with peers such as problem solving, group mediation and communication skills [49, 65, 222, 223] may have influenced these outcomes. These opportunities are often made available through a range of teaching styles and strategies that teachers may use across a range of curriculum areas but in this study, the intervention may have contributed to maintenance of high leadership self-efficacy [54].

6.5.4 Year 10 secondary outcomes

General self-efficacy

General self-efficacy improved in all Year 10 students over the 8-week period. For Year 10 students as a whole, baseline and change in general self-efficacy were the only predictors of Year 10 leadership self-efficacy. Leadership and general self-efficacy could be influenced by the activities in which students participate, both in and outside school. Many schools now offer programs and curricula to encourage the development of a range of personal skills, including leadership programs that may be potential contexts for the development of not only leadership skills and leadership self-efficacy, but also general self-efficacy and possibly physical activity self-efficacy if delivered in classes such as physical education [49, 60, 61, 186]. The close association between general self-efficacy and leadership self-efficacy is not unexpected considering many skills required for leadership are also those that are commonly used in general, everyday living and working environments such as communication and organisational skills.

Physical activity self-efficacy (PASE)

The increase in Year 10 PASE across the intervention period for all participants was unexpected. Previous research has shown that PASE usually declines during adolescence [47, 151, 154, 224]. The observed increase does not support the hypothesis that PASE would remain unchanged. There were also significant differences between the intervention and control schools PASE, with the intervention school having a higher PASE score. This

difference could be attributed to the male peer leaders, who during mid to late adolescence have in some research been found to maintain or have reported increases in PASE [70, 151]. The slightly higher number of Year 7 males compared to females in the intervention (Figure 6.1) may have provided opportunities and incentives for leaders to generate not only their own but also their teams' level of interest in the physical activity components of the program. Research has shown younger males look for role models when participating in physical activity [225] and boys usually seek peer acceptance and approval in their male peer groups [226], be that of the same-age or cross-age.

6.6 Limitations

Matching the control and intervention schools on the School and Family Occupation (SFO) index and similar size student populations was a viable option to enable a comparison between schools. Placing a randomised controlled trial (RCT) within the same school could possibly lend itself to high levels of contamination; and the feasibility of engaging a school to implement a curriculum based program for only a few students at a specific year level is very low. Unexpectedly, despite the schools being matched for SFO, there were significant baseline differences between schools on several measures. This draws attention to the difficulty in comparing a year level of students across like-schools. The unique characteristics of students and the distinctiveness of each school environment and the programs and curricula they provide make it difficult to generalise these results across all Year 10 and Year 7 school populations.

Teachers in the intervention school invited all Year 10 students (n=199) to write an application for the peer leadership positions, further identifying and approaching appropriate students after the invitation. This recruitment method was used to ensure potential leaders were serious about their participation in the program and those selected had the capacity to fulfil the requirements of the term long program. This may have resulted in selection bias, although the process of leadership application, selection and training protocol, and

responsibility to their group each week also encouraged leaders to complete the program. Leader adherence and retention were high (Figure 6.1). As the program was implemented within curriculum time, Year 7 participation with a leader was consistent each week. There was no weekly preparation required by Year 7 students, just attendance and participation. The greater effectiveness of physical activity programs implemented within school curriculum time has been previously reported [63] and should be given consideration for all future school-based interventions. However, the crowded curriculum makes this difficult [1, 4, 29].

The implementation of such an intervention once a week with Year 10 peer leaders may have been insufficient to elicit a long-term response from Year 7 students for school connectedness. However, working within the school environment requires adaptability to fit within the school structure and requirements. Possibly to ensure a more comprehensive intervention effect, such peer leadership, school connectedness and physical activity programs need to be implemented for both Terms 1 and 2 of a school year or be given consideration for a year-long intervention to provide opportunities to maximise the stealth components of the intervention: physical activity benefits and physical activity self-efficacy. This is likely to require extensive commitment, timetabling and curriculum considerations within a school setting.

The issue that school connectedness is measured by a variety of constructs has been raised previously [72]. There was only one previous study that validated and used the same questionnaire as this present study to measure school connectedness in an older adolescent cohort (Year 8 and Year 10 students). Additionally, there has only been one previous study measuring adolescent leadership self-efficacy in a Nepalese female cohort. Not only does this make it difficult to make comparisons between other studies, it also makes it difficult to use power calculations for this study because of the different research context (leadership self-efficacy) and also older age group (school connectedness).

6.7 Conclusion

School-based interventions are difficult to introduce into an already crowded school program and curriculum; sustainability is a key component of success and to achieve this, implementation during curriculum time is essential. This stealth intervention of the GLAMA and BLAST peer leadership, school connectedness and physical activity program was well received by the Year 7 and Year 10 students as well as teachers at the school. Further investigation over an extended intervention period with larger randomly selected cohorts of students across multiple school sites with variable SFO indexes is warranted. In addition, Year 7 students' school connectedness in both schools significantly declined, indicating that quality relationships, participation in and commitment to the school community are important elements for schools to address as they attempt to facilitate this transition period from primary to secondary school. The increase in self-reported PASE over the intervention period for both Year 7 and Year 10 students is of great interest and certainly warrants further investigation as it refutes most research that increasingly suggests there is a decline in participation and physical activity self-efficacy for adolescents of this age.

CHAPTER 7

Overall conclusions,

Limitations and Delimitations,

Recommendations

CHAPTER SEVEN: Overall Conclusions

7.1 Conclusions

The studies in this thesis set out to investigate the current status of physical education in Victorian state secondary schools and any factors impeding the implementation of current mandated physical education. With all the data and research pertaining to concerns regarding declining physical activity patterns of children, particularly in adolescence, it would appear that providing students with further physical activity opportunities outside their regular classes would be beneficial for long-term health. The reported success of peer-assisted learning (PAL) to promote a wide variety of positive outcomes, including physical activity behaviours and the difficulty engaging this age group, made it an ideal method to use for disseminating a school-based physical activity intervention. Therefore, these studies also set out to explore the viability of implementing such an intervention into the existing school structure to better inform not only physical activity interventions in schools, but also transition programs for Year 7 students and the development of leadership capabilities of Year 10 students.

Overall, from this series of studies the following conclusions were drawn:

i. A systematic review of literature identified a diverse range of physical activity and health outcomes after undertaking PAL in physical activity, sport and physical education interventions. Peer-assisted learning is an appropriate strategy to improve participation in physical education, physical activity and sport in schools. However, the diverse range of studies with varying scope and quality precluded a definitive statement relevant to the optimal delivery of PAL programs; particularly in relation to the training of leaders. Previous reviews of physical activity interventions in schools, not only those assessing PAL, have also identified the potential opportunities to provide students with the capacity to make considerable changes across a range of cognitive, affective and psychomotor domains [37, 50, 141].

Further PAL research particularly at secondary school level is needed as there remains uncertainly about the ideal strategies to support these types of programs. Specifically, the limitations identified in previous studies need to be considered; the gender and age of tutors and tutees; the flexibility of the curriculum to provide multi-component approaches or skill-based outcomes over longer durations; the specific model chosen to facilitate PAL; the ideal tutor training process; and measuring outcomes for both tutors and tutees including changes in leadership and education enhancing behaviours.

ii. Previous research has outlined the perilous state of physical education both worldwide and within Australia [29]. Whilst these concerns have often been put aside, there is a continual underlying concern requiring physical education teachers to defend its purpose and role within the curriculum and in schools. Physical education has a dynamic role to play in promoting physical activity to youth in Australia [14]. The preliminary study in this thesis pertaining to teachers' understanding of and schools ability to meet mandates further supports research that suggests that often school-based polices were unable to be achieved [29]. The analysis conducted on the teachers' responses to the questionnaire identified that the majority of secondary schools were still not able to meet the time required for physical education and sport in Victorian state secondary schools despite it being a mandated policy; therefore supporting the hypothesis.

iii. Barriers to physical education provision have previously been reported as those that are institutional (outside the teacher's control) or teacher-related (arising from the teacher's behaviour)[28]. The majority of previous research has predominantly focused on the primary school physical education setting which commonly involves non-physical education trained teachers and therefore should be interpreted with caution when making comparisons to the secondary school setting. Therefore an investigation was undertaken to assess the barriers teachers of physical education in

Victorian state secondary schools were facing when delivering the curriculum. Access to facilities ($\bar{x}$ =8.10, *SD*=2.30) and suitable teaching spaces ($\bar{x}$ =8.10, *SD*=2.30) were ranked by teachers as having the most impact on their provision of physical education during class time. Teachers' perceived that students greatest barriers to accessing physical education and physical activity in the school day included firstly institutional barriers (crowded curriculum and lack of facilities), then teacher-related barriers (their own difficulty engaging students) and finally that students have a low level of interest and are peer-pressured when it comes to participation (student-related barriers). These findings support the hypothesis that physical education teachers' perceived institutional barriers were the primary influence on their provision of physical education and student participation in physical activity and physical education in Victorian state secondary schools.

iv. The use of peer-assisted learning (PAL) in physical activity contexts has been well documented [50]. However, few studies have specifically investigated and reported the effectiveness of how leaders were trained, the quality of activities provided for participants, in addition to reporting outcomes for both the tutee and tutor. A pilot study to investigate these factors was undertaken specifically addressing the hypothesis that institutional factors will affect all the aforementioned elements of the intervention: the training, the activities and the overall PAL experience for students, despite it being implemented during curriculum time.

Using the RE-AIM framework, the findings from the pilot study confirmed that a school's ability to adopt, implement and maintain programs needs to be carefully considered and addressed when planning to implement a school-based physical activity intervention and that institutional factors were key components identified as influencing the sustainability of the intervention. Supporting the hypothesis; the factors with the greatest impact on the intervention's success were those identified within the school setting: the structure of the curriculum, pressure to meet curriculum

and assessment content, lack of support for new initiatives, multiple programs already running within the school, time allowances for teachers, appropriate training for teachers, and support for students to participate. Therefore finding an appropriate place within curriculum time was an important element to consider to ensure the proposed intervention was appropriate for the school setting and to enable the provision of increased physical activity opportunities for students.

v. The development and implementation of the BLAST and GLAMA peer leadership and physical activity intervention over a period of 8-weeks provided insight into Year 7 school connectedness and Year 10 leadership self-efficacy. There were no intervention effects after the 8-weeks. However, Year 7 students in both the control and intervention school experienced a significant decline in school connectedness, although somewhat elevated self-reported school connectedness were noted at baseline. This refuted the hypothesis that Year 7 participants in the intervention school would maintain their level of school connectedness. An interesting finding was the trend toward a significant increase in physical activity self-efficacy for all Year 7 students, and the significant increase in physical activity self-efficacy for all Year 10 students. In part, these results supported the secondary hypothesis that Year 7 students in the intervention school would improve physical activity self-efficacy. However, there was also improvement in Year 7 students in the control school when a decline was expected. These results are in direct contrast to the majority of findings reporting a decline in physical activity and physical activity self-efficacy during adolescence. The improvement in Year 10 physical activity self-efficacy also refuted the hypothesis. There were no significant changes to leadership self-efficacy for either Year 10 cohorts, refuting the hypothesis that Year 10 peer leaders would experience a greater increase in leadership self-efficacy than Year 10 students from the control school.

7.2 Limitations and Delimitations

Limitations and delimitations of these studies included:

i. Self-reported data has some limitations and therefore in studies one and two, teachers may not have accurately represented the physical education and school sport programs delivered within their school when responding to the questionnaire. Although mandates are in place, there are no procedures that independently assess compliance, therefore, necessitating the reliance on self-reported data. Teachers may have tended to claim more *institutional* or *student-related* barriers to avoid results reflecting poorly on their schools or physical education department. Nevertheless, teachers own ability to engage students was rated highly as a barrier. Studies three and four also used self-report and consequently students may have recorded results inaccurately. In an attempt to overcome some of the issues relating to poor recall, validated questionnaires were completed immediately or as soon as possible after training, program implementation and program completion. Timetable and school restrictions dictated timeframes for completion of tasks and may have influenced results. However, this is the reality of conducting interventions in school settings.

ii. The school selected for the pilot study was rural, and despite being ranked similarly on SFO indices with two thirds of other schools within the Victorian state secondary system, the influences on rural students' participation in such programs may be different to their metropolitan or remote counterparts. In addition, the intervention and control schools, despite being matched for SFO indices, had significant differences at baseline on several measures for both Year 7 and 10. Schools were not randomly allocated due to the difficulty in working within a school environment; there will always be unique cohorts of students and the school environment often has unique features specific to the school such as the range of programs and

curricula they can provide. This was particularly evident as both the intervention and control school required that if the program was to be administered it must be done so for all Year 7 students as it was a “timetabled” during class time. The difficulty then extends to the alternative of placing a randomised controlled trial within the same school as this could possibly lend itself to high levels of contamination across the groups. It therefore makes it difficult to generalise these results across all Year 10 and Year 7 school populations.

iii. The duration of the pilot intervention for three weeks did not enable the long-term difficulties within the school setting or with participants to be fully understood. Given it was not the primary objective of the pilot study, it did not enable an assessment of any behaviour change in Year 10 peer leaders or Year 7 girls, which is something interventions of a longer duration would consider.

Additionally, once a week with a Year 10 peer leader is not enough time to elicit a long-term response from Year 7 students and the implementation of the GLAMA and BLAST intervention over 8-weeks limits the intervention outcomes. However, working within the school environment requires the adaptability of research parameters. In the future, the recommendation is to have an intervention of at least 12 weeks to enable comparisons with other studies; specifically of physical activity outcomes. Possibly to ensure a more comprehensive intervention effect, such transition programs need to be implemented for both Term 1 and Term 2 or even over a year-long intervention, an issue that would need extensive consultation with the school when the delivery is within curriculum time.

iv. The lack of studies in both leadership self-efficacy and school connectedness during the transition between primary and secondary school makes it difficult to compare the outcomes obtained. Only one other study has assessed leadership self-efficacy in a group of girls in Nepal, specifically looking at their ability to deliver knowledge of

HIV and safe sex practices to other adolescent females [61]. Therefore, this research adds some insight into an important aspect of adolescent development.

v. The questionnaires used were all previously validated within these populations and therefore were appropriate measurement tools. In the future, additional information could be gathered from participants, specifically pertaining to previous leadership experience (Year 10) and primary school pathways to secondary school (Year 7) to provide further insight into leadership self-efficacy and school connectedness.

7.3 Recommendations

At the conclusion of these studies, several directions for future research are recommended:

i. That school physical education and sport that is mandated by the government should be regularly monitored by an independent body. This will enable us to fully understand the profile and scope of physical education in schools, particularly as we move toward a national curriculum.

ii. Further investigations are required to determine if changes to physical activity self-efficacy continue to improve over this transition period and later into the school year with or without an intervention. This will help elucidate the potential impact of the intervention on physical activity self-efficacy as behavioural changes are difficult to assess in short periods of time.

iii. Initial research on school connectedness has shown that it will decline in students of approximately 12-13 years of age [186]. This was supported by this study and has potential implications for transition programs for schools. Given that this is the time when students are most likely to disengage, the transition period must be prioritised by schools and therefore programs should be designed to facilitate smooth entry into the secondary school environment. Further research is warranted to assess

innovative school transition programs and the effect on students' school connectedness.

iv. Despite no group-by-time interactions in this study, previous research has found leadership self-efficacy significantly improved in a different cohort (adolescent females in Nepal) with an alternative primary outcome (knowledge of HIV and safe sex practices) over a 6-month period [61]. These equivocal findings suggest that further research is warranted. Conducting this research over a longer duration could enable us to understand the impact of leadership training, and the influence of training and participation on leadership self-efficacy. This would also potentially enable further development of tutee and tutor relationships and opportunities for participation in a greater number of activities that may foster leadership self-efficacy and physical activity self-efficacy.

In Summary, from this series of studies it is possible to conclude that Victorian state secondary schools find it difficult to meet mandated time requirements for physical education and even more difficult to provide mandated school sport. In addition, the barriers teacher identified as influencing their ability to implement physical education programs were largely institutional, supporting previous research. They also identified their own ability to engage students and peer pressure associated with students as influencing their delivery of and students' participation in physical education and physical activity; both important considerations for intervention planning and consultation. Although the GLAMA and BLAST intervention identified limited changes to leadership self-efficacy, school connectedness or physical activity self-efficacy over the 8-weeks, they did provide valuable insight into the transition period experienced by Year 7 students, the diverse range of leadership approaches used by Year 10 students and the dynamic and unique school environment. Interestingly, physical activity self-efficacy showed improvements, all be it small, which is in contrast to previous data reported on adolescents. Thus, these findings warrant further

investigation into the influences on physical activity participation during a longer GLAMA and BLAST intervention.

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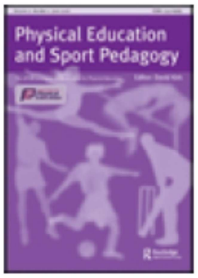
APPENDICES

APPENDIX A: PUBLISHED PEER-REVIEWED JOURNAL ARTICLES

1. **Jenkinson, K. A.**, Naughton. G. & Benson, A. C. (2012). Peer-assisted learning in school physical education, sport and physical activity programs: A systematic review. *Physical Education & Sport Pedagogy*. Published Online 02 Jan, 2013, doi:10.1080/17408989.2012.754004



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Peer-assisted learning in school physical education, sport and physical activity programmes: a systematic review

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Peer-assisted learning in school physical education, sport and physical activity programmes: a systematic review

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Background: Peer-assisted learning (PAL) is a teaching strategy utilised in both the general classroom and physical education. Through the interaction with same-age or cross-age peers, learning can occur across various domains.
Purpose: This review aimed to identify school-based PAL interventions and assess the tutor training provided, as well as the capacity of interventions to influence skill performance, physical activity and physical education participation, health and nutrition behaviours and anthropometric outcomes.
Data collection: A systematic review of databases yielded 19 papers reporting PAL in school physical education, sport or physical activity programmes.
Results: Only four randomised controlled trials were identified in this review and only two other studies had control groups. Nine of the 19 studies reported significant findings; the implementation of PAL in a range of different physical education and physical activity contexts led to a diverse range of outcomes. Tutor training varied considerably; 13 of the 19 studies provided some training.
Conclusions: Despite support for and success of PAL in other subject areas within schools, there have been few interventions implemented and vigorously evaluated within school physical education, sport or physical activity programmes. There is a need for future research to consider the duration and quality of tutor training in addition to measuring outcomes for both the tutee and tutor. Importantly, the adaptability of PAL across a range of settings provides scope for future research to assess its ability to impact on children and adolescents within a range of healthy lifestyle interventions both inside and outside the school environment.

Keywords: peer-assisted learning; physical education; physical activity; school-based interventions; tutoring

Introduction

The development of exercise, physical activity and healthy lifestyle behaviours among children and adolescents can translate into reduced health risks later in life (Dobbins et al. 2009). Hence, providing quality education throughout early critical and impressionable stages is a vital component in combating potential health risks. Schools have been identified as crucial health settings and should be encouraged to further develop physical education and physical activity programmes that are appropriate and motivating for students (Naylor and McKay 2009; Pate et al. 2006).

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A review of school-based physical activity programmes has found a growing body of evidence of physical activity interventions being implemented in schools (Salmon et al. 2007). Indeed schools may be best placed to provide the most holistic and developmentally appropriate experiences in health and physical activity. A multitude of factors including the amount of time students spend within schools, and the elements of the school curriculum such as physical education that have the potential to be modified and adapted to meet a range of outcomes, ensure schools are well positioned to provide access to these experiences.

Despite having an environment potentially rich enough to impart this knowledge, schools have a large number of educational outcomes and directives to meet. Within the physical education curriculum, providing knowledge of strategies to alleviate potential health risks is a small component of an overall objective; opportunities for development across the psychomotor, affective and cognitive domains should also be provided (Bailey et al. 2009). To achieve these many outcomes, physical educators are required to implement different teaching styles, strategies and programmes to assist student learning and development.

In view of adolescents' preferences to interact with and therefore be influenced by peers, and the accessibility to each other within the school environment, the case for peers assisting peers in many roles including education is both feasible and compelling (Ellis, Marsh, and Craven 2009). A myriad of terms are used to describe 'peer interactions'. Many terms are creative blends and have selective elements from peer-based instructional models and programmes representing a diverse range of goals and assumptions (Damon and Phelps 1989). Despite varied terminology, the common underpinning value is that through the interaction with peers, learning occurs across various domains.

Peer-assisted learning (PAL) is one generic label used to describe teaching strategies and models that facilitate peer education practice (Ward and Lee 2005) and will be used throughout this review to represent the collective 'PAL' process. PAL in an instructional strategy and has been shown to have great transferability across a range of educational contexts (Topping and Ehly 1998). Commonly used teaching models that incorporate various components of peer-based interaction and learning in physical education and school physical activity programmes include: peer tutoring, peer teaching and class-wide peer tutoring (Byra 2006; Damon and Phelps 1989; Meztler 2005; Ward and Lee 2005). Many studies have included peer tutoring and PAL in the area of general classroom education as well as for remedial interventions. Moreover, the benefits of peer teaching for students with disabilities are well documented (Cohen, Kulik, and Kulik 1982; Miller, Topping, and Thurston 2009; Okilwa and Shelby 2010; Stenhoff and Lignugaris/Kraft 2007). The variations in PAL programmes include not only a multitude of different titles that can be used, but a range of variables which can also be manipulated (Fuchs et al. 1997). In doing so, different outcomes can be achieved: same-age or cross-age tutoring, same gender or mixed-gender tutoring, reciprocal or unidirectional, settings (classroom or outside the classroom), intensity (one session per week or five sessions per week of various durations), time of day (inside or after/outside school), targeted domain (social, cognitive, physical) and scope (supporting current curriculum or changing the curriculum).

In summary, as only 15% of Australian secondary school students are sufficiently active to provide health benefits (Cancer Council Australia and National Heart Foundation of Australia 2011), physical education teachers may need to re-assess strategies to motivate and activate students. This is particularly evident as some teachers report difficulties in engaging students within their classes and physical activity programmes (Jenkinson and Benson 2010). PAL in physical education is potentially one strategy that could be used

to overcome some aspects impeding student learning and enjoyment. It is also helpful in addressing the teachers' difficulty in directly observing and instructing each individual student (Meztler 2005). Furthermore, each student's opportunity to respond and receive higher amounts of feedback and reinforcement from peers as well as teachers (Kirk, Macdonald, and O'sullivan 2006) could possibly provide opportunities for specific and additional development in the cognitive, psychomotor and affective domains.

The purpose of this systematic review was to evaluate the effectiveness of school-based interventions that specifically include elements of PAL that are incorporated into school physical education, sport and/or school physical activity programmes for children and adolescents aged 5–18 years. The specific objectives were: (i) to evaluate existing PAL intervention approaches and assess the effectiveness of these approaches on physical activity and physical education participation and behaviours, motor skill performance, health behaviours, psychosocial behaviours and anthropometric outcomes; (ii) to evaluate the selection criteria and the training process undertaken by tutors and tutees in the implementation of PAL interventions.

Methods

The following databases were searched on 20 January 2012: AMED (1985 to January 2012); EBM Reviews – ACP Journal Club (1991 to December 2011); EBM Reviews – Cochrane Register of Controlled Trials (Fourth Quarter, 2011); EBM Reviews – Cochrane Database of Systematic Reviews (2005 to December, 2011); EBM Reviews – Cochrane Methodology Register (First Quarter, 2012); EBM Reviews – Database of Abstracts of Reviews of Effects (Fourth Quarter, 2011); EBM Reviews – Health Technology Assessment (First Quarter, 2012); EBM Reviews – NHS Economic Evaluation Database (First Quarter, 2012); ERIC (1966 to present); Ovid MEDLINE(R) (1946 to January, Week 2, 2012); Ovid MEDLINE(R) Daily Update (20 January 2012); Pre-MEDLINE (most recently published); Ovid OLDMEDLINE(R) (1947–1965); PsycINFO (1806 to January Week 3, 2012); CINAHL (1981 to January Week 3, 2012); SPORTS DISCUS (1830 – January Week 3, 2012).

First, three keyword categorical searches were performed (i) 'school' or 'junior high' or 'secondary school' or 'middle school' or 'high school'; (ii) 'peer leader' or 'vertical form' or 'PAL' or 'peer tutor' or 'school leader' or 'social support' or 'peer support' or 'peer providers' or 'peer led initiatives' or 'peer social support'; (iii) 'physical activity' or 'PE' or 'physical education' or 'sport' or 'outdoor education' or 'adventure therapy' or 'Duke of Edinburgh'. Secondly, all categories (i–iii) were combined using 'AND' and limited to: studies including humans, reported in the English language, and those that included children and adolescents aged 5–18 years. Duplicates were then removed. In addition, reference lists of all publications meeting the inclusion criteria were manually searched to identify any further studies not found through electronic searching (Figure 1).

Inclusion and exclusion criteria

Studies that met the following criteria were included in this review:

(i) published in English; (ii) cohorts were children or adolescents (aged 5–18); (iii) physical activity, physical education or sport interventions; (iv) included a PAL component that was reciprocal or unidirectional with peer interactions occurring predominately in dyads (pairs); (v) interventions were in schools; (vi) interventions were conducted post-1990. Thesis, doctoral dissertations, conference proceedings, edited books and structured

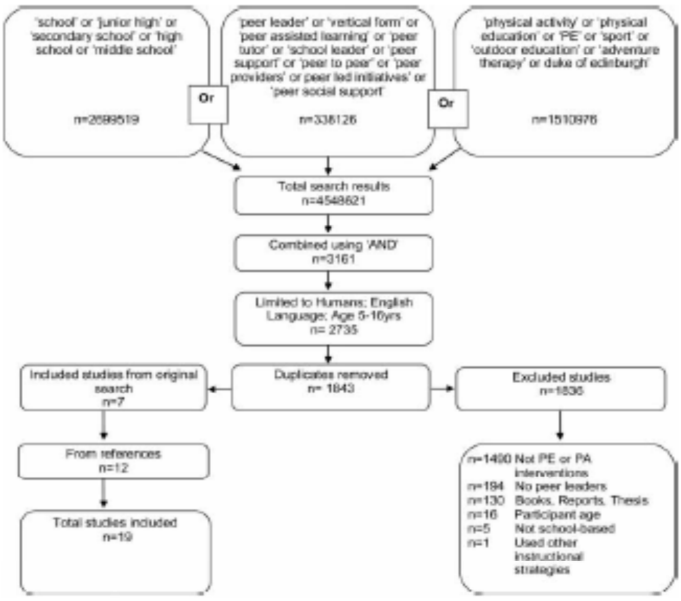

Figure 1. Search protocol.

abstracts were excluded. Subsequent publications derived from these were searched. In addition, cooperative learning interventions were also excluded due to the lack of a defined tutor role. A total of 19 published intervention studies were identified (Figure 1). A summary of intervention characteristics can be found in Table 1.

Results

Study design

Substantial methodological variations were observed across studies (Table 1). There were four randomised controlled trials (Ernst and Byra 1998; Lubans et al. 2011; Peralta, Jones, and Okely 2009; Smith 2011) and one non-randomised controlled trial (NRCT) (Stock et al. 2007). Of the 14 other interventions, only one other used a control group (Ensergueix and Lafont 2010). Multiple baseline studies in different variations including single-subject designs were used in seven studies (Houston-Wilson et al. 1997; Johnson and Ward 2001; Klavina and Block 2008; Lieberman et al. 1997, 2000; Ward et al. 1998; Wiskochil et al. 2007). Other methodologies included: single-subject withdrawal (Ayvazo and Ward 2009; Crouch, Ward, and Patrick 1997), factorial design (2×3) (D'Arripe-Longueville et al. 2002; Ensergueix and Lafont 2010) and (4×2) (Ward et al. 1998), time-series design (Strickland, Temple, and Walkley 2005) and a case study (Brown 1993).

Intervention duration (per session and total)

The shortest duration for delivering a single PAL session was between 20 and 30 min (Byra and Marks 1993; Crouch, Ward, and Patrick 1997; Houston-Wilson et al. 1997; Johnson and Ward 2001; Klavina and Block 2008; Ward et al. 1998), with the longest duration for a single session being 120 min (Brown 1993; Ensergueix and Lafont 2010)

Table 1. Summary of PAL interventions in PE and physical activity programmes in schools.

Author (date)	Setting	Ages	When implemented	Name/sport	Design	Intervention duration			Participants		
						Per session	Total	Total time	Total participants	Tutors	Tutees
PAL interventions involving students in schools											
Ayvazo and Ward (2009)	P	S	PE	Volleyball	Single subject withdrawal	48 min	20 lessons	16 h	$n = 4$ $I = 4$ $T = 4$ $C = 0$ ♀	$n = 4$ $M = 2$ $F = 2$ Age = NR (4–6th grade)	$n = 4$ $M = 2$ $F = 2$ Age = NR (4–6th grade)
Byrn and Marks (1993)	P	S	PE	Soccer- juggling and dribbling	Comparative research design (4 × 2)	25 min	2 lessons	50 min	$n = 32$ $I = 32$ $T = 32$ $C = 0$ ♀	$n = 32$ $M = 14$ $F = 18$ Age = 9–12	$n = 32$ $M = 14$ $F = 18$ Age = 9–12
D'Arripe-Longueville et al. (2002)	Sec	S	PE	Swimming	Factorial design (2 × 3)	1 lesson	1 lesson	1 lesson	$n = 96$ $I = 48$ $T = 48$ $C = 0$ Uni	$n = 48$ $M = 24$ $F = 24$ Age = x̄ 18.5	$n = 48$ $M = 24$ $F = 24$ Age = x̄ 18.3
Crouch, Ward, and Patrick (1997)	P	S	PE	Volleyball	Single-subject withdrawal	20–30 min	20 lessons	6 h	$n = 67$ $I = 67$ $T = 67$ $C = 0$ PMA	$n = 67$ $M = 36$ $F = 31$ Age = NR (4–6th grade)	$n = 67$ $M = 36$ $F = 31$ Age = NR (4–6th grade)
Ensergueix and Lafont (2010)	Sec	S	PE	Table tennis	Factorial design (2 × 3)	120 min	8 weeks	16 h	$n = 72$ $I = 48$ $T = 48$ $C = 24$ ♀	$n = 48$ $M = NR$ $F = NR$ Age = x̄ 15.1	$n = 48$ $M = NR$ $F = NR$ Age = x̄ 15.1
Ernst and Byrn (1998)	Sec	S	PE	Juggling	RCT	35 min	8 lessons	4.4 h	$n = 60$ $I = 48$ $T = 48$ $C = 12$ ♀	$n = 48$ $M = NR$ $F = NR$ Age = NR (6–9th grade)	$n = 48$ $M = NR$ $F = NR$ Age = NR (6–9th grade)
Johnson and Ward (2001)	P	S	PE	Striking skills	Multiple baseline design	25 min	20 lessons	8.3 h	$n = 11$ $I = 11$ $T = 11$ $C = 0$ ♀	$n = 11$ $M = 3$ $F = 8$ Age = 7–8	$n = 11$ $M = 3$ $F = 8$ Age = 7–8
Lubans et al. (2011)	Sec	X	SPORT	PALs Programme Elastic tubing Gymsticks™	RCT	30–90 min	26 weeks	~26 h	$n = 100$ $I = 50$ $T = 100$ $C = 50$ Uni	$n = 100$ $M = 100$ $F = 0$ Age = x̄ 14.3 (9th grade)	$n = NR$ $M = NR$ $F = 0$ Age = NR (7th grade)
	Sec	X	PE	FILA – Fitness	RCT	100 min	16 weeks	24 h	$n = 33$	$n = NR$	$n = 33$

(*Continued*)

Table 1. Continued.

Author (date)	Setting	Ages	When implemented	Name/sport	Design	Intervention duration			Participants		
						Per session	Total	Total time	Total participants	Tutors	Tutees
Peralta, Jones, and Okely (2009)				Improvement Lifestyle Awareness					$I = 16$ $T = NR$ $C = 17$ Uni	$M = NR$ $F = 0$ Age = NR (11th grade)	$M = 33$ $F = 0$ Age = 12–13 (7th grade)
Smith (2011)	P&Sec	X	After school	Just for Kids! (modified form)	RCT – pilot study	60 min	8 weeks	8 h	$n = 85$ $I = 35$ $T = 13$ $C = 37$ Uni	$n = 13$ $M = NR$ $F = NR$ Age = NR (10–11th grade)	$n = 72$ $M = 22$ $F = 50$ Age = ï8.51–12.0 (3rd–4th grade)
Stock et al. (2007)	P	X	HAPE	'Healthy Buddies'	NRCT – pilot study	90 min	40 weeks	60 h	$n = 383$ $I = 116$ $T = 116$ $C = 151$ Uni	$n = 116$ $M = NR$ $F = NR$ Age = NR (4–7th grade)	$n = 116$ $M = NR$ $F = NR$ Age = NR (K–3rd grade)
Ward et al. (1998)	P	S	PE	Basketball lay-up	Multiple baseline design	20–30 min	20 lessons	6 h	$n = 55$ $I = 55$ $T = 55$ $C = 0$ PMA	$n = 55$ $M = 31$ $F = 24$ Age = NR (4–5th grade)	$n = 55$ $M = 31$ $F = 24$ Age = NR (4–5th grade)
PAL interventions involving students with a disability in schools											
Brown (1993)	P&Sec	X	Outside school hours	'CARE'	Case study	120 min	16 weeks	32 h	$n = 113$ $I = 66$ $T = 47$ $C = 0$ Uni	$n = 47$ $M = NR$ $F = NR$ Age = NR (high school)	$n = 66$ $M = NR$ $F = NR$ Age = NR (elementary school)
Houston-Wilson et al. (1997)	P	S	PE	Discrete motor skills	Delayed multiple baseline design	30 min	NR	29 h	$n = 12$ $I = 12$	$n = 6$ $M = 2$	$n = 6$ $M = 5$

									$T = 6$ $C = 0$ Uni	$F = 4$ Age = 9–11	$F = 1$ Age = 9–11
Klavina and Block (2008)	P	S	PE	GPE	Single-subject delayed multiple baseline design	30 min	46 lessons	23 h	$n = 12$ $I = 3$	$n = 9$ M = NR	$n = 3$ $M = 1$
									$T = 9$ $C = 0$ Uni	F = NR Age = 8–9	$F = 2$ Age = 8–9
Lieberman et al. (2000)	P	S	PE	GPE	Single-subject delayed multiple baseline design	45 min	32 lessons	24 h	$n = 16$ $I = 8$	$n = 8$ $M = 4$	$n = 8$ $M = 4$
									$T = 8$ $C = 0$ Uni	$F = 4$ Age = NR (4–6th grade)	$F = 4$ Age = NR (4–6th grade)
Lieberman et al. (1997)	P	X	PE	GPE	Single-subject delayed multiple baseline design	35 min	NR	NR	$n = 12$ $I = 6$	$n = 6$ M = NR	$n = 6$ M = NR
									$T = 6$ $C = 0$ Uni	F = NR Age = NR (5th grade)	F = NR Age = NR (K–2nd grade)
Strickland, Temple, and Walkley (2005)	P	S	PE	Fundamental motor skills – striking	Time-series design	6 lessons	6 lessons	6 lessons	$n = 10$ $I = 5$	$n = 5$ M = NR	$n = 5$ M = NR
									$T = 5$ $C = 0$	F = NR Age = $\bar{x}$ 10.1	F = NR Age = $\bar{x}$ 10.1
Wiskochil et al. (2007)	P&Sec	S	PE	GPE	Single-subject delayed multiple baseline design	6–8 lessons	6–8 lessons	6–8 lessons	$n = 8$ $I = 4$	$n = 4$ M = NR	$n = 4$ $M = 2$
									$T = 4$ $C = 0$ Uni	F = NR Age = NR (3rd–11th grade)	$F = 2$ Age = NR (3rd–11th grade)

Note: C = control; © class-wide peer tutoring; F = females; HAPE = both health and physical education classes; high school = secondary school; I = intervention group/tutees; K = kindergarten – first year of school approximate age 4/5 years old; M = males; n = total number in intervention; NR = not reported; NRCT = non-randomised control trial; P = primary school; PE = physical education; PMA = peer-mediated accountability tutoring model; P&Sec = combined primary and secondary school; ® = reciprocal tutoring; RCT = randomised control trial; S = same-age tutoring; Sec = secondary school; T = tutor; Uni = uni-directional tutoring; $\bar{x}$ = mean age; X = cross-age tutoring.

(Table 1). Minimal total intervention durations included one lesson (D'Arripe-Longueville et al. 2002) and 50 min (Byra and Marks 1993). In contrast, other interventions took place over: 4–12 h (Crouch, Ward, and Patrick 1997; Ernst and Byra 1998; Johnson and Ward 2001; Smith 2011; Strickland, Temple, and Walkley 2005; Ward et al. 1998; Wiskochil et al. 2007), 16–30 h (Ayvazo and Ward 2009; Ensergueix and Lafont 2010; Houston-Wilson et al. 1997; Klavina and Block 2008; Lieberman et al. 2000; Lubans et al. 2011; Peralta, Jones, and Okely 2009), 32 h (Brown 1993) and 60 h spread throughout a school year (Stock et al. 2007). In summary, 15 of the 19 studies were between 8 and 32 h in duration and were mostly delivered using single sessions each week to achieve this.

Intervention settings: school context and type of PAL

All interventions took place within the school setting; either in primary (elementary) or secondary (high) schools. Eleven interventions included both the tutor and tutee attending primary school (Ayvazo and Ward 2009; Byra and Marks 1993; Houston-Wilson et al. 1997; Johnson and Ward 2001; Klavina and Block 2008; Lieberman et al. 1997, 2000; Stock et al. 2007; Strickland, Temple, and Walkley 2005; Ward et al. 1998). Three studies involved tutees in primary schools and tutors in secondary schools (Brown 1993; Smith 2011; Wiskochil et al. 2007), and five interventions were conducted completely within secondary schools (D'Arripe-Longueville et al. 2002; Ensergueix and Lafont 2010; Ernst and Byra 1998; Lubans et al. 2011; Peralta, Jones, and Okely 2009).

Regardless of school type, a total of 13 studies involved same-age tutoring (Ayvazo and Ward 2009; D'Arripe-Longueville et al. 2002; Ensergueix and Lafont 2010; Ernst and Byra 1998; Houston-Wilson et al. 1997; Johnson and Ward 2001; Klavina and Block 2008; Lieberman et al. 2000; Strickland, Temple, and Walkley 2005; Ward et al. 1998; Wiskochil et al. 2007), with the remaining six interventions involving cross-age tutoring in dyads with older tutors and younger tutees. There were four studies that involved reciprocal PAL (Ayvazo and Ward 2009; Byra and Marks 1993; Ensergueix and Lafont 2010; Ernst and Byra 1998), two studies incorporated peer-mediated accountability (PMA) (Crouch, Ward, and Patrick 1997; Ward et al. 1998) and one involved class-wide peer tutoring (Johnson and Ward 2001). The remaining 12 studies used unidirectional tutoring.

Only one intervention was delivered across a combined health and physical education class in a whole school approach (Stock et al. 2007). Two interventions were delivered outside class time by secondary school tutors to primary age tutees (Brown 1993; Smith 2011). The remaining 16 interventions were delivered during physical education or sport lessons. The majority (17 of 19 studies) of the interventions were delivered during curriculum time.

Participants: tutors and tutees

In general, sample sizes were small (Table 1). A total of eight studies had between 3 and 11 tutees (Ayvazo and Ward 2009; Houston-Wilson et al. 1997; Johnson and Ward 2001; Klavina and Block 2008; Lieberman et al. 1997, 2000; Strickland, Temple, and Walkley 2005; Wiskochil et al. 2007), with the largest number of tutees in an intervention being 116 students (Stock et al. 2007). Similarly, the number of tutors involved varied greatly, with the smallest being four tutors (Ayvazo and Ward 2009; Wiskochil et al. 2007) and the study with the largest number of tutors cited 116 students (Stock et al. 2007). The ratio of tutors to tutees was one to one in 16 of the 19 studies. Three studies did not

clarify their specific ratio although the intervention protocol suggests didactic relationships (Lubans et al. 2011; Peralta, Jones, and Okely 2009; Smith 2011).

Participants: age and gender

Most tutees were in primary school (14 of 19 studies), this included two studies with tutees in their first year of school (kindergarten: approximately 5 years old) (Lieberman et al. 1997; Stock et al. 2007). Of the five secondary school interventions, reported tutees ages ranged from 12 to 18.3 years (D'Arripe-Longueville et al. 2002; Ensergueix and Lafont 2010; Ernst and Byra 1998; Peralta, Jones, and Okely 2009; Smith 2011). Twelve studies failed to report all mean age ranges of participants, tutors or tutees; however, they did report school year levels (Ayvazo and Ward 2009; Brown 1993; Ernst and Byra 1998; Houston-Wilson et al. 1997; Lieberman et al. 1997, 2000; Lubans et al. 2011; Peralta, Jones, and Okely 2009; Smith 2011; Stock et al. 2007; Ward et al. 1998; Wiskochil et al. 2007).

Only two studies included males only as tutees (Lubans et al. 2011; Peralta, Jones, and Okely 2009). Of the remaining 17 studies that included both males and females as tutees, seven studies failed to separately report the number of male and female tutees involved in their study (Brown 1993; Ensergueix and Lafont 2010; Ernst and Byra 1998; Lieberman et al. 1997; Lubans et al. 2011; Stock et al. 2007; Strickland, Temple, and Walkley 2005).

Ten studies lacked a description of the ratio of male and female tutors (Brown 1993; Ensergueix and Lafont 2010; Ernst and Byra 1998; Klavina and Block 2008; Lieberman et al. 1997; Peralta, Jones, and Okely 2009; Smith 2011; Stock et al. 2007; Strickland, Temple, and Walkley 2005; Wiskochil et al. 2007). The remaining nine interventions reported the number of both males and females as tutors. Two studies had male-only tutors (Lubans et al. 2011; Peralta, Jones, and Okely 2009).

In summary, the youngest reported tutor age was 7 years, the oldest 18.5 years old. Over half of the studies reported both males and females as tutees, and studies generally had between 4 and 11 tutors with as many as 116 students as tutors. Twelve interventions were unidirectional, six involved cross-age tutoring and 13 same-age tutoring.

Selection criteria

Tutors were required to meet various inclusion criteria to take part in interventions (Table 2). Inclusion criteria were based broadly on behaviour, school circumstances, and skill or task completion. All interventions were conducted where tutors and tutees were in the same class or schools nearby. Eleven tutors were selected by volunteering, had a desire to be a tutor or had previous tutoring experience (Brown 1993; Byra and Marks 1993; D'Arripe-Longueville et al. 2002; Ernst and Byra 1998; Houston-Wilson et al. 1997; Klavina and Block 2008; Lieberman et al. 1997, 2000; Smith 2011; Strickland, Temple, and Walkley 2005; Wiskochil et al. 2007). A total of seven interventions required that their tutors were competent enough to pass a fitness, skill or knowledge test in the relevant context (Ensergueix and Lafont 2010; Houston-Wilson et al. 1997; Klavina and Block 2008; Lieberman et al. 1997, 2000; Peralta, Jones, and Okely 2009; Wiskochil et al. 2007). Similarly, 9 of the 19 interventions required a proficient or appropriate skill level of tutors. Tutee and tutor selection required gender matching in 7 of the 19 studies (Table 2).

Table 2. Tutee and tutor selection criteria and training processes.

Author (date)	Duration		Tutor/tutee relationship		Tutor selection criteria						Training received by tutors						
	Training (total time)	Number of training sessions	Same class or same school/ nearby	Gender matched	Proficient/ appropriate level FMS	Volunteered/ desire to be tutor/ previous experience	Teacher recommendation	Few behavioural problems/ attendance	Pass test /fitness test	Friends	Instructing	Modelling/ demonstrating	Physical guiding	Feedback	Error correction	Practice	On-going training provided
PAL interventions involving students with a disability																	
Ayvazo and Ward (2009)	48 min	1	✓		✓			✓			✓	✓	✓	✓		✓	
Byra and Marks (1993)	None	NA	✓		✓	✓				✓							
Crouch, Ward, and Patrick (1997)	None	N/A	✓														
D'Arripe-Longueville et al. (2002)	None	None	✓	✓	✓	✓											
Ensergueix and Lafont (2010)	120 min	8	✓	✓	✓				✓		✓	✓		✓			
Ernst and Byra (1998)	None	NA	✓		✓	✓											
Johnson and Ward (2001)	25 min	1	✓	✓	✓			✓			✓	✓		✓	✓	✓	
Lubans et al. (2011)	90 min	3	✓				✓										
Peralta, Jones, and Okely (2009)	20 min	1	✓				✓		✓								

Smith (2011)	360 min	2	✓			✓	✓			✓	✓		✓				
Stock et al. (2007)	45 min	NR	✓														
Ward et al. (1998)	None	NA	✓	✓	✓												
PAL interventions involving students with a disability																	
Brown (1993)	NR	NR	✓			✓											
Houston-Wilson et al. (1997)	30 min	2	✓		✓	✓	✓		✓		✓		✓	✓			
Klavina and Block (2008)	30 min	3	✓			✓	✓		✓	✓	✓	✓	✓	✓	✓		
Lieberman et al. (2000)	30 min	4/5	✓	✓		✓		✓	✓	✓	✓	✓	✓	✓		✓	
Lieberman et al. (1997)	150 min	1	✓		✓	✓			✓	✓	✓	✓	✓	✓	✓		
Strickland, Temple, and Walkley (2005)	1× lunch time	1	✓	✓		✓		✓		✓	✓		✓	✓	✓		
Wiskochil et al. (2007)	60–120 min	1	✓	✓		✓			✓	✓	✓	✓	✓	✓	✓		

Note: ✓ = Intervention required this relationship, skill, behaviour or training process; min = minutes; NR = not reported; none = no training given to tutors.

Training of tutors

The specific training process for tutors was not reported or tutor training was not completed in six studies (Brown 1993; Byra and Marks 1993; Crouch, Ward, and Patrick 1997; D'Arripe-Longueville et al. 2002; Ernst and Byra 1998; Ward et al. 1998) (Table 2). In contrast, variations of between 20 min and 6 h of training were provided for tutors (Peralta, Jones, and Okely 2009; Smith 2011). Only one intervention reported providing ongoing training for tutors (Lieberman et al. 2000).

In summary, 13 of the 19 studies provided some training for tutors. However, the quantity and quality of training received and the information or strategies used varied greatly (Table 2). Information was provided in some interventions on how to deliver appropriate instructions to peers, how to model skill-based activities and the types of feedback available to communicate. It is evident that studies involving students with disabilities provide more comprehensive training for tutors.

Intervention outcomes

A summary of the objective, observational and subjective measures used by studies to assess various outcomes can be found in Table 3. Nine of the 19 studies reported statistically significant results after PAL interventions.

Anthropometric measurement

The 'Healthy Buddies' NRCT reported significant changes to height and weight for the control and intervention participants ($p < 0.001$) (Stock et al. 2007). The study involved the weekly delivery by older students (fourth to seventh grade) of 30 min of relevant theory and two 30-min physical activity sessions per week over the 40-week school year intervention period to younger 'buddies'. Changes to BMI and heart rate between baseline and follow-up were not significantly altered. Anthropometric changes were not the primary outcome for this study and it is usual to expect maturational changes in this age group over a period of a school year.

Tutees also experienced a significant reduction in BMI percentile ($p < 0.05$) for the intervention group participating in a teen mentoring programme modelled on the Just for Kids! Programme (Smith 2011). Conducted after school, the 60-min sessions conducted over 8 weeks included tutees and tutors spending 50 min on task-oriented activities pertaining to exercise choices, daily activity and food. In addition, there was a further 10 min of physical activity and games when all groups joined together. The high school tutor and primary school tutee ratio was 1:1 or 1:2.

Despite reporting small to medium intervention effect sizes for a range of outcomes measured, there were no significant changes to students' BMI ($p = 0.50$), waist circumference ($p = 0.27$) or percentage body fat ($p = 0.30$) in the 'Fitness Improvement and Lifestyle Awareness Programme' (FILA) (Peralta, Jones, and Okely 2009). Over 16 weeks, Year 7 boys were involved in a weekly 60-min curriculum session during physical education and two 20-min lunchtime-modified games and activity sessions led by Year 11 male peer leaders. In contrast, the 'Physical Activity Leaders'' programme also conducted with adolescent boys found a significant beneficial intervention effect for BMI ($p < 0.001$) and a significantly decreased prevalence of overweight and obesity in the peer leaders' intervention group ($p < 0.001$) (Lubans et al. 2011). This intervention involved Year 9 boys conducting their own physical activity and leadership programme, and delivering

Table 3. Outcomes from PAL interventions in physical education and physical activity programmes in schools.

Author (date)	Skill performance measures		Physical activity/physical education behaviour measures			Health/nutrition behaviour measures	Psychosocial measures		Anthropometric measures
	Objective	Observation	Objective	Observation	Survey	Survey	Survey	Observation	Objective
PAL interventions involving students in schools									
Ayvazo and Ward (2009)	✓	✓		✓					
Byra and Marks (1993)			*						
Crouch, Ward, and Patrick (1997)	✓								
D'Arripe-Longueville et al. (2002)	*	*					*		
Ensergueix and Lafont (2010)	*	*					✓		
Ernst and Byra (1998)	*								
Johnson and Ward (2001)	✓	✓							
Lubans et al. (2011)			✓			*			*
Peralta, Jones, and Okely (2009)			*			x			x
Smith (2011)						*✓			*
Stock et al. (2007)			*			*✓			*
Ward et al. (1998)	✓								
PAL interventions involving students with a disability in schools									
Brown (1993)								✓	
Houston-Wilson et al. (1997)	✓		✓						
Klavina and Block (2008)			✓	✓			✓		
Lieberman et al. (2000)			✓	✓					
Lieberman et al. (1997)			✓	✓					
Strickland, Temple, and Walkley (2005)	*	*							
Wiskochil et al. (2007)			✓	✓					

Note: ✓ = Positive changes or increases to performance/behaviour; * = significant results $p < 0.05$; skill performance measures – no subjective measures were used; health/nutrition behaviour measures – no objective measures used; X = recorded but no significant outcomes.

knowledge learnt relevant to resistance training to Year 7 boys during six lunchtime sessions in a cross-age tutoring environment over the intervention period of 26 weeks. The Physical Activity Leaders' programme is the only study included in this review which provided peer leader outcomes (Year 9 boys) and no peer tutee outcomes (Year 7 boys).

Health/nutrition behaviour

The aforementioned 'Healthy Buddies' study yielded more significant outcomes with changes in health knowledge ($p < 0.01$) and health behaviour ($p < 0.001$), both measured via self-report (Stock et al. 2007). These were recorded in tutee intervention groups across various ages (Kinder to seventh grade).

There was a significant reduction in the reported consumption of sugar-containing beverages ($p < 0.05$) in the Year 9 peer leaders intervention group involved in the Physical Activity Leaders' programme (Lubans et al. 2011). The FILA intervention also recorded the beverage intake of students, but no changes in the intervention group were found (Peralta, Jones, and Okely 2009).

The third and fourth grade students involved in the Just for Kids! modelled intervention reported nutritional changes post-intervention. There was a significant increase in the students' reported behavioural intention to 'eat healthfully' ($p < 0.05$), and a significant increase in nutritional knowledge ($p < 0.05$) (Smith 2011).

Of the four studies that used PAL to measure anthropometric and health/nutrition outcomes, all used cross-age tutoring in either primary (Stock et al. 2007) or secondary schools (Lubans et al. 2011; Peralta, Jones, and Okely 2009) or a combination of primary and secondary schools (Smith 2011).

Physical activity and physical education: participation and behaviours in class

The interactions displayed by three students with severe mental disabilities and their nine tutors were assessed during an inclusive elementary physical education class (Klavina and Block 2008). Class tutees were provided with three instructional support conditions including: the physical education teacher starting the lessons, their tutors providing peer-mediated support during the skill activities and voluntary support which they received from their peers during game time. Although no significant changes occurred, overall time engaged in physical activity increased for all tutees as measured by the Computerised Evaluation Protocol of Interactions in Physical Education tool (CEP-PI) which codes instructional, physical and social interactions of students (Klavina and Block 2008).

The primary objective of a similar elementary physical education study was to see the effect cross-age-trained tutors had on the percentage of time tutees with a disability spent engaged in motor-appropriate behaviour (Lieberman et al. 1997) as defined by their academic learning time-physical education (ALT-PE) (Parker 1989). Findings suggested that 'on task' time specific to the activities increased. Results were similar in two further interventions that used the ALT-PE measurement tool for students with hearing difficulties (Lieberman et al. 2000) and students with visual impairments (Wiskochil et al. 2007) participating in inclusive physical education classes with tutors.

Findings across all four studies suggest that interactions between tutees and teachers decreased, indicating tutees had less reliance on their physical education teacher and greater interaction with their tutors. Each of these studies used various measures to assess 'on task' time for students with disabilities in physical education classes, including direct observation, CEP-PI and ALT-PE to assess participation. Although none of the

studies had control groups and sample sizes were very small with the maximum eight tutees and nine tutors, this represents the usual nature of an inclusive or integrated physical education environment.

The 'Healthy Buddies' intervention reported statistically significant improvements in physical activity participation ($p < 0.01$) in intervention groups across various ages (Kinder to seventh grade) (Stock et al. 2007). However, the physical activity outcome was the increase in distance covered during the 9-min run, an effect that could potentially be attributed to the maturation or the training of subjects over 40 weeks.

The Year 7 boys that participated in the curriculum and lunchtime activities with their peer leaders significantly improved their weekday ($p = 0.06$) and weekend ($p = 0.04$) vigorous physical activity after the 6-month FILA intervention (Peralta, Jones, and Okely 2009). Although not significant, the Physical Activity Leaders' programme noted trends in changes to physical outcomes, including test results of upper-body muscular endurance ($p = 0.09$) and abdominal strength ($p = 0.07$) of Year 9 boys who were leading Year 7 boys during resistance training (Lubans et al. 2011).

In primary school physical education classes, the impact of pairing students in friendship dyads and by skill ability was investigated using soccer juggling and dribbling across two 25-min classes (Byra and Marks 1993). Each dyad was assigned a pre-service teacher to provide them with instructional information prior to their completion of reciprocal tasks. Those paired with a friend provided specific feedback at a higher rate per minute than learners not with friends and the control group ($p < 0.05$). Pairing by skill ability had little effect on the amount or specific feedback given. Similarly, those paired with friends were more comfortable when receiving feedback than those not with friends ($p < 0.05$) (Byra and Marks 1993).

Overall, four studies with the aim of improving physical education, physical activity participation or associated behaviours used same-age tutoring in both primary and secondary schools, with a one to one ratio (Byra and Marks 1993; Klavina and Block 2008; Lieberman et al. 2000; Wiskochil et al. 2007). The remaining four interventions measuring changes in participation used cross-age tutoring in two secondary schools (Lubans et al. 2011; Peralta, Jones, and Okely 2009) and two primary schools (Lieberman et al. 1997; Stock et al. 2007).

Motor skill development and performance

The assessment of tutoring and how it affects skill level in a one-off swimming lesson found significant changes to skill performance (D'Arripe-Longueville et al. 2002). Tutors demonstrated a breaststroke turn to their tutee, which was followed by 8 min of tutees training freely with the tutor. During this time, the number of trials, demonstrations and verbal interactions were recorded. Results were recorded immediately after the free training and then 2 weeks later. Comparing tutee achievement and tutor skill level revealed a significant relationship ($p < 0.001$) showing the learners who were paired with novice skill level tutors failed to perform as well as a learner paired with a skilled tutor. Gender significantly influenced skill level, with skilled male tutors demonstrating significantly better results in their tutee outcomes than skilled female tutors ($p < 0.01$). The number of attempts and demonstrations were influenced by the interaction with tutors, with male tutees more likely to have greater attempts than female tutees ($p < 0.01$).

Pairing of secondary school students in a reciprocal juggling task over a period of eight lessons provided the opportunity to examine the effects of pairing learners by motor skill ability and the effect this would have on skill performance and cognitive performance

(Ernst and Byra 1998). Juggling was utilised as it was a novel task to all students and none had received any formal instruction prior to the study. Students' level of juggling expertise was assessed prior to the intervention as high or low and they were then assigned in same-gender dyads of similar ability or with a partner of different ability. The teacher started the class with instructions before dyads conducted their own reciprocal tutoring. The study found that low-skilled learners showed significant improvement from pre- to post-test for both skill technique ($p < 0.01$) and skill outcome ($p < 0.02$) regardless of with whom they were paired. The high-skilled learners who were paired with low-skilled learners also improved significantly, however, only for the skill outcomes ($p < 0.01$). Significant changes over the eight-lesson intervention of knowledge of skill components required in juggling were also recorded by the high–high, high–low and low–low skilled learners ($p < 0.01$) (Ernst and Byra 1998).

The number of trials attempted and number of correct trials increased in a sixth grade class-wide peer teaching volleyball intervention (Ayvazo and Ward 2009). All tutors underwent training and were placed in the same team to complete volleyball tasks presented on cards. Practising was then allowed and peer tutoring commenced with tutees and tutors changing roles and teams completing tasks as appropriate. Video analysis was used to examine the total number of trials and correct trials performed. This study supports the trend of a greater number of attempts and correct trials when using class-wide peer teaching in striking skill applications (Johnson and Ward 2001) and swimming (D'Arripe-Longueville et al. 2002).

Although using a different peer tutoring condition, the number of trials also increased during 1-min time periods of volleyball setting and digging skills in a fourth to sixth grade primary school physical education setting using PMA (Crouch, Ward, and Patrick 1997). The assessment of the effects of PMA includes having dyads working together but they are guided by elements such as teacher-established goals, peer recording of performance, public display of student performances and the use of games for rewards (Byra 2006; Crouch, Ward, and Patrick 1997). The sequence of the lesson to complete the volleyball tasks was as follows: a whole-group instruction (work individually), followed by working in peer dyads and then PMA. Overall, there was an increase in the number of trials performed. The frequency and percentage of correct trials increased and were most apparent in the PMA conditions in contrast to the individual and dyad conditions (Crouch, Ward, and Patrick 1997).

Over a longer period of time (2.5 min) than the above-mentioned study, PMA was used in a primary school study that focused on basketball layups (Ward et al. 1998). This study also found for average-skilled students the number of trials performed at least doubled from baseline. PMA was effective in increasing the opportunities to respond for both average- and low-skilled students (Ward et al. 1998).

A table tennis intervention using reciprocal peer tutoring found significant changes in motor skill development over 8 weeks ($p < 0.001$) and benefits of having the same-gender tutors ($p < 0.001$) (Ensergueix and Lafont 2010). Findings suggest implementation of reciprocal peer tutoring leads to superior motor performance for tutees, in contrast to individual practice time with no tutoring and students completing reciprocal peer tutoring with tutors who did not have any training (Ensergueix and Lafont 2010). Tutors' behaviours during interactions were stipulated by a set of rules including: observing their tutees attentively, reminding and demonstrating what should be done, allowing tutees to ask questions, comforting and encouraging when tutee was in difficulty and congratulating them upon successful task completion. Students were randomly assigned to one of the three conditions.

Significant improvements in performance of the fundamental motor skills, the forehand strike ($p < 0.03$) and two-handed side-arm strike ($p < 0.01$) were observed in students with a mild intellectual disability after they had been tutored in a physical education class over six lessons (Strickland, Temple, and Walkley 2005). To achieve this, pre- and post-tests were conducted following a physical education class in which the teacher taught the warm-up and skill activity and the tutor worked with the tutee during the skills session. Tutors were instructed to listen to the teacher, tell the tutee about the activity, demonstrate the skill, observe their tutee's performance and give specific or corrective feedback (Strickland, Temple, and Walkley 2005).

Despite the primary outcome of the study focusing on motor performance of discrete skills, the effectiveness of peer tutors was also evaluated in an integrated primary school physical education class (Houston-Wilson et al. 1997). Six typically developing peers served as peer tutors to six participants with developmental disabilities. Two 30-min training sessions were provided for peer tutors. Following a warm-up, and fitness activity, in the skill focus component of the lesson, tutees were analysed for the presence/absence of five critical elements that would make up each skill (jump, catch, throw, strike). Each participant was videotaped for the entire class with the focus on only the skill. Findings suggest that trained peer tutors were deemed effective at assisting participants to improve their motor performance while untrained peer tutors were not (Houston-Wilson et al. 1997).

In summary, in studies where peer tutors had higher skill knowledge and skill performance ability (D'Arripe-Longueville et al. 2002; Ernst and Byra 1998; Strickland, Temple, and Walkley 2005) and received training prior to their tutoring roles in a reciprocal peer teaching context (Ensergueix and Lafont 2010; Houston-Wilson et al. 1997), significant or positive changes to measured outcomes of tutees occurred. All of the eight studies that reported changes to motor performance or behaviours involved same-age tutors in both primary and secondary school environments.

Psychosocial

The nature of the research publication or study methodology may have limited some studies to report only positive qualitative psychosocial trends, including that from the CARE (Children's Art and Recreation Experience) programme (Brown 1993). It was presented by 'buddies' for 2 h per week on Saturday mornings for 8 weeks. Trained high school 'buddies' joined a student with special needs aiming to support the students' engagement in both art and physical activity experiences. The physical activity element was guided by an experienced physical education teacher, who introduced ideas to 'buddies' and who, in turn, adapted activities to their 'little buddies' capabilities.

In contrast, a quantitative study has shown that learners who had tutors during a short-duration intervention requiring the completion of a set swimming skill demonstrated improvements in both skill level and self-efficacy ($p < 0.05$) (D'Arripe-Longueville et al. 2002). Self-efficacy was also measured during a table tennis reciprocal peer tutoring intervention, with strong positive correlations between self-efficacy and having a trained female tutor compared with no correlation when tutees had an untrained male tutor (Ensergueix and Lafont 2010).

Discussion

PAL is a teaching strategy employed in both primary and secondary schools, in the general classroom and physical education. Research pertaining to PAL in the general classroom has

been comprehensively acknowledged previously, so our purpose in reviewing recent articles was to specifically assess the potential of PAL interventions for influencing physical and health-enhancing behaviours. We found limited evidence of the effect of PAL when used in physical education, during sport or school-based physical activity interventions with only 19 articles meeting the criteria for inclusion in this review. Despite support for and success of PAL in other contexts and subject areas within schools, there are less than 20 rigorously implemented and evaluated interventions in the physical education and physical activity areas in schools that have been published.

PAL: teaching in physical education for skill development and performance outcomes

Of the few studies found in this review documenting variations of PAL, the available data unsurprisingly support that implementation within different subject areas of the curriculum will lead to different outcomes. Of those interventions delivered only within the physical education and sport that measured changes in skill performance and development (n = 9), four resulted in significant outcomes in striking skills (Strickland, Temple, and Walkley 2005), swimming (D'Arripe-Longueville et al. 2002), table tennis (Ensergueix and Lafont 2010) and juggling (Ernst and Byra 1998). Other positive outcomes occurred in volleyball (Ayvazo and Ward 2009; Crouch, Ward, and Patrick 1997) and in discrete skills such as the basketball layup (Ward et al. 1998), striking (Johnson and Ward 2001) and throwing and catching (Houston-Wilson et al. 1997).

The key issue in these afore-mentioned studies is there is a lack of comparison with other teaching methods and strategies that teachers may use to achieve similar skill-based outcomes. Furthermore, student's usual method of practice and skill level that was previously developed within the class was reported in few studies and therefore it is difficult to assess the isolated effectiveness of the application of PAL on both tutees and tutors. Additionally, the changes that occurred across one discrete swimming or striking skill do not represent the typical physical education class in which usually both discrete and serial skills are taught and developed. Therefore, in the future, it would be important to compare a PAL model with usual teaching practice to be able to determine if any extra benefit obtained in skill development was due directly to the peer learning strategies.

PAL: a multi-component approach

Of the four studies measuring health outcomes, three were delivered within the school curriculum, and one after school. Three reported significant and favourable health-related changes (Lubans et al. 2011; Smith 2011; Stock et al. 2007). When combining the intervention delivery across both the physical education and the health curriculum, the 'Healthy Buddies' study demonstrated significantly improved health knowledge of different food values, physical activity behaviours, healthy living choices and healthy living attitudes of participants after a year-long intervention (Stock et al. 2007). Similarly, an after-school programme designed to foster both health and physical activity outcomes also produced significant outcomes (Smith 2011).

These findings are consistent with previous studies (Dobbins et al. 2009; Salmon et al. 2007; Van Sluijs, Mcminn, and Griffin 2007) suggesting a whole-curriculum approach (using both physical education and health education) could further enhance the range of outcomes students obtain. However, it is unlikely that a 'whole'-package approach will suit all students and schools, particularly in a cross-age PAL intervention. Careful consideration of individualised strategies to implement PAL interventions is therefore essential to

ensure they integrate not only theoretical but also practical concepts. In addition, it is imperative that where an intervention is best suited within the school programme is assessed. An example of this is the Physical Activity Leaders' programme which focused on resistance training for adolescent boys to achieve a range of outcomes across physical activity, health and anthropometric measurements (Lubans et al. 2011). The programme involved Year 9 leaders not only completing their own programme, but also introducing resistance training to Year 7 boys via PAL. Although tutee outcomes were not measured, the programme utilised a training method which is popular and has recorded success with adolescent boys and provided a supportive cross-age PAL environment both in and outside curriculum time (Lubans et al. 2011).

Dyad/group selection

Improvements to psychosocial outcomes were recorded in four studies that all involved same-age and same gender tutoring (Brown 1993; D'Arripe-Longueville et al. 2002; Ensergueix and Lafont 2010; Klavina and Block 2008). These findings draw attention to the importance of the selection process of tutors and the impact this may have on both the primary and secondary outcomes of studies. Findings suggest that tutors with more proficient motor skills and knowledge of the task can assist tutees to gain greater positive psychosocial outcomes and consequently improve tutee performance (D'Arripe-Longueville et al. 2002; Ensergueix and Lafont 2010; Ernst and Byra 1998; Ward and Lee 2005). This may be attributed to the tutees having more confidence in their tutors and therefore applying themselves more comprehensively to the task at hand.

The appropriate pairing of the dyad or group during PAL activities cannot be understated, as this appears to be a crucial component to any PAL intervention. Gender-based studies suggest girls rather than boys are more effective tutors and are better task orientated, however, may not benefit as much as males from the overall tutoring experience (Ward and Lee 2005). In comparison, boys tend to focus on developing their own knowledge, comparing themselves with others and being competitive, and may show stronger performance gains than females (D'Arripe-Longueville et al. 2002; Owens and Barnes 1982; Ward and Lee 2005). However, this may not always be the case, with some females regardless of ability performing similarly to males (Johnson and Ward 2001). Increases in female self-efficacy also suggest that same-gender tutor and tutee roles may be highly beneficial for females (Ensergueix and Lafont 2010). Furthermore, the proposed pairing of dyads with friends to provide a higher rate of feedback and increase the comfort level of the tutee in receiving feedback showed positive associations (Ward et al. 1998) and warrants further investigation.

PAL: the effectiveness of cross-age, same-age, reciprocal and unidirectional tutoring

With 13 of the 19 studies being conducted in same-age contexts, it is difficult to assess which PAL strategy is most appropriate to use to modify performance and certain behaviours. However, it is evident that all interventions that were focused on developing motor behaviours used same-age tutoring. In contrast, all interventions seeking health-related changes all involved cross-age tutoring.

As many of the skill behaviours and performance interventions were conducted over short durations, the benefits of using peer tutoring to provide feedback at a higher rate and the benefits of immediate task-related information to the learner are invaluable (Mosston and Ashworth 2002). Consequently, the increased amount, immediacy and

content of feedback, in addition to the ability to practice tasks may have led to improved motor performances. If the intervention involved reciprocal rather than unidirectional tutoring, opportunities for improvements to performance would have been apparent for both students in the dyad.

Same-age tutoring also provides a unique context where peers may possibly have more insight into how to best communicate and interact with people of the same age. Additionally, they have greater insights into learning difficulties of their peers and learning by teaching provides great social reinforcement (Topping and Ehly 1998). Cross-age tutoring is more likely to enable the tutor to demonstrate greater knowledge, eliminate the competitive element between peers and protect the tutees self-esteem (Cohen 1986). It is therefore not surprising that this approach was used for the health behavioural interventions where knowledge was often passed from the tutor to tutee. The consideration and selection of different PAL strategies may be largely guided by the outcomes desired; we can conclude that interventions concerned with improving skill performance and behaviours tended to favour and effectively use same-age tutoring. In contrast, cross-age tutoring was used more frequently in interventions with the intention of providing and promoting knowledge.

Intervention duration

Potentially, enhanced exposure to an intervention could result in a greater impact on participants. However, in general, the duration of the intervention was indeterminate of outcomes. Therefore, conclusive statements cannot be drawn about the optimal time length for a PAL intervention. Significant changes occurred in PAL interventions with minimal duration of only one lesson (D'Arripe-Longueville et al. 2002) in contrast to as long as 40 weeks (Stock et al. 2007). Within the classroom, it is certainly feasible that a one-off maths or English class may develop 'skill or concept knowledge', but the longevity and retainment of that knowledge will take further practice and application throughout future classes. Similarly, the three interventions which resulted in significant motor skill performances (D'Arripe-Longueville et al. 2002; Ensergueix and Lafont 2010; Strickland, Temple, and Walkley 2005) highlight the ability to improve motor skills over minimal time periods (one, six and eight lessons) and therefore it appears that interventions targeting motor skill adaptations could indeed develop from a single exposure to PAL. However, similar to learning in maths or English, being able to ingrain this skill for long-term applications may be conditional on practice and further application. Adherence and improvements in motor skills may indeed replicate the process of adherence to physical activity whereby the transtheoretical model (Prochaska and Velicer 1997) indicates that maintaining behaviours takes longer than 6 months and relapses are common. In summary, duration of a PAL intervention needs to consider whether the desired outcomes need to instigate acute or chronic changes in participants.

Training duration and implementation

The inference that training or training of a longer duration may lead to more effective tutoring and consequently tutee outcomes (skill or behaviour) is partly supported by the results of this review (Table 2). The findings of substantive gains for students who were tutored by trained versus untrained tutors (Houston-Wilson et al. 1997) contrast with the four studies with significant findings that had training durations for their peer tutors of a single lunch time (Strickland, Temple, and Walkley 2005), for 20 min in duration (Peralta, Jones, and Okely 2009), or had no training at all (D'Arripe-Longueville et al. 2002; Ernst and Byra

1998). These findings suggest it is plausible that significant outcomes for tutees, after their tutor had minimal or no training exposure, could be expected in skill outcomes and potentially physical activity participation (Table 2). The effectiveness of trained verses untrained tutors has been questioned previously (Ward and Lee 2005) and remains unresolved with several studies providing conflicting results in this review.

The modification of motor skill performance outcomes over short-term periods is in direct contrast to studies that are seeking harder to modify long-term outcomes of psychosocial or health behaviours. Potentially, this could explain the effectiveness of the 6 h of training provided in the Just for Kids! randomised controlled trial which resulted in significant and positive outcomes concerning health and nutrition behaviours of tutees. In summary, it is apparent that the duration and implementation of training programmes for tutors should be carefully considered; results suggest that the number and type of outcomes to be modified by the intervention will greatly determine this.

Training protocol

Our review draws to attention the training process undertaken by tutors during interventions involving students with a disability which were far more rigorous than in other studies in this review (Table 2). Furthermore, a selection of studies included testing to ensure tutors were aware of appropriate strategies and tutoring methods to use with their tutees with a disability (Houston-Wilson et al. 1997; Klavina and Block 2008; Lieberman et al. 1997, 2000; Wiskochil et al. 2007). Ensuring that tutors are knowledgeable, competent and understand the context in which they are tutoring certainly supports the findings of greater on-task physical activity and academic time of tutees. However, the lack of evaluation of the tutor training also highlights that future interventions should consider the effectiveness of their training process. They need to equip tutors with the appropriate skills and knowledge that will enable them to work optimally with their tutee to maximise the benefits to both themselves and those that they are working with. The limited reporting of the training methodology used with tutors does not allow definitive conclusions to be made regarding the most effective tutor training strategies, duration or testing procedures, nor does it support the external validity of the results. This highlights previous findings of the lack of reporting of the training protocol and the effects of being a tutor in a physical education environment (Ward and Lee 2005).

PAL: children and adolescent interventions outside school physical education and sport

All studies included in this review have incorporated PAL in the school environment. However, the versatility of the PAL instructional strategy enables its application to many settings. For example, researchers focusing on healthy lifestyle interventions for children and adolescents, rather than skill development, should consider the outcomes of this review. The significant anthropometric, health and nutrition outcomes (Lubans et al. 2011; Smith 2011; Stock et al. 2007) reported from these school-based interventions suggest that utilising similar methodologies that incorporate PAL in settings that are outside of school may be appropriate. Interestingly, all interventions reporting significant health-related outcomes involved cross-age tutoring; in contrast, all changes to physical activity outcomes occurred using same-age tutoring. Although further insights regarding training protocols for PAL and dyad formation particularly relating to gender are required, the findings in this review may offer some direction for future interventions in settings other

than schools. This will be particularly important as schools increasingly struggle to facilitate new initiatives with many competing curriculum demands and constraints.

Limitations

Several limitations in study designs were identified. The brief descriptions of some interventions greatly hampered the comprehension of how the intervention was implemented, the participant detail and consequently the components that were or were not effective. Overall, methodological limitations across the studies included: the lack of external validity, no random selection of groups, lack of control groups, short and/or great variance in duration, no follow-up and mostly small sample sizes.

Despite this, the unique physical education environment which often limits external validity offers much in terms of the value of the collective findings of these studies which were conducted in a variety of school contexts and used many variations of PAL. The nature of the type of publication and methodology limited some studies to only report qualitative trends with minimal statistical analysis and results should therefore be interpreted with caution (particularly in the absence of control groups). With eight studies involving fewer than 16 participants, the generalisation to other school contexts becomes difficult. Interventions were also included that provided opportunities for students with a disability within integrated or inclusive physical education or physical activity PAL contexts to work with a tutor, so generalising the outcomes to a whole school population is not necessarily appropriate.

Conclusion

The range of studies with varying scope and quality precludes a definitive statement about the nature of the effectiveness of PAL in physical education, sport and physical activity interventions in schools. However, the need for well-designed interventions that meet the needs of participants by providing other benefits in addition to physical activity outcomes are henceforth required. Supporting previous reviews of physical activity opportunities and implementation in schools, this review highlights that PAL has the potential to provide students in schools with the capacity to make healthy lifestyle, motor skill and behavioural adaptations. However, the limitations and methodological differences make comparisons between studies extremely difficult.

Further research, particularly at the secondary school level, is needed to understand best practices when using PAL. Future studies should consider a robust methodology reflecting the need to adapt to different school climates or multiple school sites and quality measures of tutor training. What remains uncertain are ideal strategies to support these types of programmes and the following components need to be strongly considered: the gender and age of tutors and tutees; the flexibility of the curriculum to provide multi-component approaches or skill-based outcomes over longer durations; the specific model chosen to facilitate PAL; the ideal tutor training process; and measuring outcomes for both tutors and tutees including changes in leadership and education-enhancing behaviours.

PAL may be conducive to promoting a positive and engaging learning environment for both the tutor and tutees. The impact that PAL has on a range of variables including cognitive, psychosocial and motor skill development has been well documented. However, more research is required to explore the use of many PAL structures that may enable teachers to facilitate greater improvements across the development of motor skills, physical activity and health and nutrition behaviours, knowledge and attitudes within the school

physical education and health curriculum. Importantly, the adaptability of PAL across a range of settings provides scope for future research to assess its ability to impact on children and adolescents within a range of healthy lifestyle interventions both inside and outside the school environment.

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2. **Jenkinson, K. A.**, Naughton. G. & Benson, A. C. (2012). The GLAMA (Girls! Lead! Achieve! Mentor! Activate!) physical activity and peer leadership intervention pilot project: A process evaluation using the RE-AIM framework. *BMC Public Health*. 12 (55).

The GLAMA (Girls! Lead! Achieve! Mentor! Activate!) physical activity and peer leadership intervention pilot project: A process evaluation using the RE-AIM framework

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Abstract

Background

Implementing new initiatives and physical activity interventions in schools represents a myriad of challenges that if overcome can potentially facilitate a range of behavioural changes. The aim of this paper is to describe the process evaluation of specific design constructs used in the GLAMA (Girls! Lead! Achieve! Mentor! Activate!) peer leadership and physical activity pilot project. Conducted in a state secondary school in Australia, the intervention was designed to provide students with opportunities to develop leadership skills, school and social connectedness in addition to a range of physical activity experiences.

Methods

This process evaluation used the RE-AIM (Reach, Efficacy, Adoption, Implementation and Maintenance) health promotion evaluation framework to assess three design constructs of the

intervention: the effectiveness of leadership training and leader preparedness, activity suitability and participation, and the barriers to implementation of the intervention and potential solutions to overcome these barriers. As it was not the specific aim of this pilot, no behavioural change data were collected from students. Data were collected using a mixed methods approach including student questionnaires, teachers and researchers reporting on their own observations and feedback from students.

Results

There were three main considerations evident across more than one RE-AIM dimension that need to be addressed to assist with future GLAMA dissemination. Firstly, the development of teacher, school and student participation. This needs to be through a variety of professional development opportunities for teachers, integration of the program within timetabled classes within the school and promoting the program to students as an opportunity to develop a range of skills to apply to future learning and workplace environments. Secondly, the successful translation of leadership training to practice is necessary to ensure that leaders are effectively able to motivate, facilitate and activate their teams. Finally, the need for consistent activity implementation requires sequential, competitive elements, purposeful team selection and clearly defined scoring and time periods for team 'challenges'.

Conclusions

Factors that have the greatest impact on intervention success are those that come from within the school setting including: the structure of the curriculum, pressure to meet curriculum and assessment content, lack of support for new initiatives, multiple programs already running within the school, time allowances for teachers, appropriate training for teachers, and support for students to participate. These barriers need to be considered when developing all secondary school interventions.

Background

Schools are recognised as key health settings and their importance in promoting knowledge of physical activity and healthy lifestyle behaviours via physical education and physical activity programs is well documented [1,2]. Despite this recognition, there are a lack of effective intervention strategies to promote physical activity in school children; therefore the development of effective physical activity interventions in schools continues to be a priority [3]. Nevertheless, promoting physical activity and healthy lifestyle behaviours among children and adolescents is a complex challenge [4], especially in a school context with many competing educational outcomes and institutional constraints.

School-based interventions are appropriate in many ways due to the level of continuous, intensive contact with students during their developmental years [5]. However, previously reported difficulties with implementing a range of interventions in schools have included the; lack of teacher participation, lack of program readiness, absence of program advocates, inadequacy of funding, reduction in infrastructure, poor association between the program's key features and organization routines, limited teacher training and support, insufficient amount of program materials, and inconsistent staffing [6-8]. Ultimately, effective interventions require the combination of careful planning and the engagement of the whole school community.

Notwithstanding the difficulties associated with implementing school-based interventions, the constant drive for schools and teachers to meet students' needs necessitates the adaptation of existing content as well as the successful implementation of new initiatives and interventions. Teachers are aware of their own difficulties facilitating engaging programs, especially in the area of physical activity and physical education [9]. Subsequently, teachers need to consider a range of teaching strategies, styles and methods for student engagement to ensure learning outcomes for all students.

One such strategy which involves peer assisted learning, encourages development across all learning domains. Peer assisted learning, teaching, tutoring or mentoring [10] are frequently interchanged terms. The commonality is that each strategy is underpinned by a learning process whereby students learn from and with others; this can be with students of the same-age or from those who are older (cross-age). Peer assisted learning in physical education and physical activity may overcome some aspects that impede student learning, enjoyment and participation by providing opportunities for increased levels of feedback, social learning and less direct instruction from the teacher [11]. This is particularly important for all adolescents, but especially girls who experience greater age-related declines in physical activity levels [12] and may not be attracted to the sometimes competitive, rigorous and the potentially uncomfortable nature of physical education [13].

Peer assisted learning appears to be an excellent vehicle for participant improvements to health/nutrition outcomes [14,15], physical activity participation including increasing on task behaviours [16-19], skill development [20-24], and self efficacy [23,24]. More specifically, a recent study of peer assisted learning in a physical activity leaders (PAL) program which used resistance training in adolescent boys reported significant reductions of several physiological outcomes [25], supporting previous findings from a lunchtime peer led activity program which also reported encouraging physiological changes in adolescents [26].

If peer assisted learning is conducted within a cross-age or same-age context then leadership opportunities are also provided for students. Whilst undertaking the role of 'peer tutor' or 'peer leader', the benefits reported have included; enhanced understanding of concepts, increased self determination, improved reorganization, clarification and knowledge building skills [27]. These leadership qualities are not exclusive to physical activity contexts. Promising peer assisted learning programs in remedial settings and other curriculum areas [28-31] highlight that programs outside those which are traditionally teacher-led may be successful in influencing student behaviour.

The RE-AIM health promotion evaluation framework [32] has been used to evaluate the multi-faceted components of interventions. The framework has previously been used in studies in primary school physical activity interventions [4,5,33] and community sport contexts [34]. The benefits of using the RE-AIM health promotion evaluation framework [32] are that it enables complex settings based interventions, such as those in school settings, to be comprehensively evaluated.

In summary, considering the potential benefits for students associated with peer assisted learning such as leadership development, increases in psychosocial and physiological outcomes in addition to increasing physical activity participation, an intervention in schools that provides opportunities to develop these components and can also engage girls should be considered. In an attempt to address the afore-mentioned parameters: the GLAMA (Girls! Lead! Achieve! Mentor! Activate!) peer leadership and physical activity intervention was

Cognitive Theory [35], the concept was also driven by the previous teaching experiences of the research team and our research into teacher perceptions, barriers and ability to implement physical education and physical activity in schools [9,36]. Ethical approval was obtained from both a University Human Research Ethics Committee and the State Department of Education and Early Childhood Development. Parental and participant dual consent was obtained for participation in the leadership program and for questionnaire completion.

The activities used in the program were guided by an 'Adventure Racing' concept [37] and were based on providing opportunities to complete 'challenges' in groups before moving forward to the next activity. A 'racetrack' consisting of a lap of the gymnasium court was also included between activities. The basic structure of each 'challenge' is outlined in Figure 1. No 'challenges' required a high level of pre-existing motor skills or particular sporting attributes. Primarily, 'challenges' focused on team work, cognitive strategies, and opportunities to develop positive physical activity experiences. The venue for each 'challenge' was a school gymnasium, but activities could easily have been conducted in a range of indoor or outdoor environments.

Figure 1 Activity 'challenge' format

Participants

Participation by the state secondary school occurred after teachers indicated interest in a leadership and physical activity program. The rural school had a Student Family Occupation (SFO) Index rating (as determined by the state education department) [38] of medium which was within the desired low-medium rating for the study. A total of 67% of state secondary schools within the state currently have this rating. Three physical education teachers were involved in facilitating the project; two taught the Year 7 girls and one teacher recruited and liaised with Year 10 peer leaders to assist with the leadership training and program implementation.

All Year 7 girls (12–13 years old) and Year 10 girls (15–16 years old) at the school were invited to participate via an assembly at which information was provided (Figure 2). Year 10 peer leaders were provided with music vouchers in appreciation of the time commitment required to lead the Year 7 students. Girls were chosen as our target demographic as they are often underserved in terms of encouragement and opportunities to partake in both physical activity and leadership development, particularly in rural communities [39]. Importantly, the declining participation rates, predominately in girls as they progress through secondary school were also considered a vital element to consider and attempt to address [12,13].

Figure 2 GLAMA intervention pilot project implementation timeline

Implementation

The intervention was conducted during October, 2010. Following recruitment, training was completed with the Year 10 peer leaders (Figure 2). We used a 'train the trainer' model which has been successfully incorporated in many health contexts [40,41] and appears to be appropriate in meeting outcomes in educational contexts [42,43]. The aim of the one day of leadership training conducted by researchers was to develop appropriate skills to enable peer leaders to lead their small team. The training specifically involved theoretical components, questioning, partner activities, brainstorming and group discussion to facilitate development. The following five key areas were addressed: understanding and developing leadership

characteristics, developing communication skills, developing management skills to lead their group, and behaviour and motivation modification techniques. They also participated in the 'challenge' activities in which the role-modelling of both leader and participants took place.

The GLAMA program was conducted during the regular sport education [44] curriculum time. In the intervention school, the sport education program focused on gaining knowledge of game structures and strategies through participation in traditional games with few modifications. This is in contrast to fundamental skill development through activities and modified games provided in physical education. Therefore, teachers felt it was appropriate to implement 'team-based' activities in their curriculum with the GLAMA intervention able to meet similar outcomes (physical activity, team building, and social outcomes) to those encouraged in a traditional sport education unit.

The first assisted implementation was guided by the researchers and the three physical education teachers during week two. Year 7 teams were carefully chosen and considered friendship groups and positive, constructive relationships avoiding any confrontational issues which had concerned teachers previously. Peer leaders then completed the introduction session of 10 min with their Year 7 team including getting to know you activities and team identity formation through the establishment of rules and a team name. Teams and peer leaders then commenced the 'Blindfold Challenge'. The session was shorter than anticipated and went for 65 min due to externally imposed constraints of the school timetable.

The final unassisted implementation of the 'Paper Race' and 'Ball Challenge' occurred during week three. Due to three peer leaders missing, some teams were merged with others to accommodate this. Peer leaders independently led and implemented activities with their group with assistance only provided by teachers and researchers when setting up equipment. The session ran for the duration of class time, in total 110 min.

Data collection

Data collection focused firstly on the one day training program provided for peer leaders (Figure 2). Data were collected using project specific questionnaires to evaluate the effectiveness of the training program in providing the required skills and engaging peer leaders in their forthcoming role. Secondly, the overall GLAMA intervention was evaluated by peer leaders, teachers and researchers after completion of the intervention. It entailed the use of a mixed methods approach including questionnaires, reporting on observations and feedback from students. The researchers implemented the training and observed all sessions conducted by the peer leaders. Evidence derived in a mixed method approach can offer guidance on how to create conditions for successful adoption, implementation and maintenance of interventions [5]. As it was not the intention, no behaviour change data were collected from students.

Results

Results for the dimension REACH

Two Year 7 girls' only classes with 34 girls in total were available for recruitment (Figure 2). The physical education teachers encouraged all girls to participate, however if they chose not to, they were offered alternative sport education opportunities in other classes during the intervention period. Participation during assisted implementation (n = 28) and unassisted

implementation (n = 31) was high due to the program being run during curriculum time (Figure 2).

A total of 31 Year 10 girls were available for leadership training: eight girls completed the training (Figure 2). Year 10 peer leaders were difficult to reach with problems recruiting indentified as: existing commitments to a large range of school programs, reluctance to leave classes (as they would have to catch up on missed content), and unwillingness to work with Year 7 girls. There was also hesitation to engage in physical activity promotion or participation themselves despite the potential leadership advantages being gained and a small voucher being offered as an appreciation of their time and involvement.

The three teachers were accessible and responded to requests for information promptly. Both Year 7 physical education teachers agreed that they had difficulty throughout the year engaging their Year 7 girls in sport education and were appreciative of the opportunity to try a different approach in an attempt to engage their students.

Results for the dimension EFFICACY/EFFECTIVENESS

Outcome 1: The effectiveness of leadership training and leader preparedness

Training priorities were to equip peer leaders with skills to understand content, competently deliver it and engage their teams. All training was implemented by the researchers. The results for leadership training and leader preparedness are shown in Table 2. Despite only one day of training prior to the program commencing, leadership training was positively rated amongst the eight peer leaders with 100% of leaders reporting that after the completion of training they had the confidence to lead a group of Year 7 girls through the program (Table 2). All peer leaders were ready (25%), very ready (63%) or extremely ready (12%) to lead their groups after training. Uncertainty surrounding leadership preparedness after the first assisted implementation related to difficulties with activities (remembering them the week following training), and understanding the written instructions. In evaluating the program, a total of 100% of peer leaders believed that their training equipped them with the skills to lead their team throughout the whole intervention (Table 2).

Table 2 The effectiveness of leadership training and level of leader preparedness in Year 10 student leaders

When	Outcome Measured	Description	Result	Sample Comments
After Leadership training (n = 8) Week 1	Leadership training	Would you be confident in leading a group of 4–5 Year 7 girls in the activities? ‡	Yes = 100%	N/A
		Would you be confident in leading your peers in the activities?‡	Yes = 100%	N/A
	Leader preparedness	1. How 'READY' are you to lead your group of Year 7 girls?¥	Ready = 25% Very Ready = 63% Extremely Ready = 12%	N/A
After assisted implementation (n = 7) Week 2	Leader preparedness	2. Did you find anything difficult about: a) any activities‡	No = 86% Not sure = 14%	"A bit hazy on most, needed showing what the activities were"
		b) working with year 7 students‡	No = 100%	N/A
		c) understanding written instructions‡	No = 86% Not sure = 14%	"Some were a bit confusing".
		d) using equipment‡	No = 100%	N/A
		e) comprehending the challenge‡	No = 86% Not sure = 14%	N/A
		f) leading the group‡	No = 100%	N/A
	Leader preparedness	3. Did you feel confident leading your group in the activities today? ‡	Yes = 86% Not sure = 14%	"I was excited to be a leader for the Year 7's".
	Leader preparedness	4. How 'READY'are you to lead your group of Year 7 girls again next week? ¥	Ready = 28.5% Very Ready = 43% Extremely Ready = 28.5%	N/A

	Leader preparedness	5. How 'MOTIVATED' are you to work with your group again next week?¥	Fairly Motivated = 43% Very Motivated = 43% Extremely Motivated = 14%	N/A
Debrief session between implementations (n = 7)	Leader preparedness	A debrief session provided for leaders to discuss their first session and address any difficulties that they may have experienced in preparation for the next implementation. No structured questions were asked.	N/A	N/A
After unassisted implementation Program evaluation (n = 7) Week 3	Leadership training	6. Did your training equip you with the skills to lead your team?‡	Yes = 100%	"It was hard to getting the girls motivated…" "We didn't have enough time to complete the challenge" "At the beginning everyone was shy…" "I had difficulty engaging them"
	Leader preparedness	Were you adequately prepared each week to lead your group?‡	Yes = 71% Not sure = 29%	N/A
		Did you like leading and working as part of a team to achieve the 'challenges'?‡	Yes = 86% Not sure = 14%	N/A

Note: ‡ = 3 point Likert scale = "Yes", "No", "Not sure"; ¥ = 5 point Likert scale = "Not at all", "Close", "Ready", "Very", "Extremely"; Assisted implementation = first session where leaders were given assistance as required from teachers; Unassisted implementation = second session when leaders worked independently to lead their groups

Researchers' observations of the positive outcomes of training and ability to implement training objectives during the intervention included the peer leaders: prompt setting up and organization across all three 'challenges', selection and use of appropriate equipment, use of learned motivational techniques to encourage their team, quick movement between 'challenges', giving assistance when required to prompt their team in cognitive activities, use of activity cards and score sheets appropriately when difficulties arose.

Outcome 2: Activity suitability and participation

i) Year 7 Girls

The first activity, the 'Blindfold Challenge' was selected as it requires significant team work, communication, trust and a whole team contribution. The feedback teachers received from Year 7 students regarding the GLAMA program have been presented in Table 3. They have been grouped into common themes and focus on activity or program components, team work, and peer leader relationships. In summary, the Year 7 girls enjoyed many elements of the activities. However, the 'racetrack' component of the 'challenges' was not viewed quite as favourably (Table 3). Working with peer leaders, with peers and in teams was well received. In relation to affective development opportunities; girls wanted to choose their own groups, but also commented that swapping groups to work with others may also be of benefit to helping them get to know people.

Table 3 Participant responses to selected questions from the program evaluation (Year 7 and Year 10) following the GLAMA pilot program

	What was the best part of the GLAMA program?	What was the worst part of the GLAMA program?
YEAR 7 RESPONSES (n = 31)		
Activity/Program	"All the activities were fun" "The first weeks' activities (referring to the Blindfold Challenge)" "It was fun" "We liked that it was competitive" "Helps you to get fit"	"We had to run a lap after every activity" "The running a lap" "Running around the room"
Team Work	"Working in teams" "Working with others" "Working with my friends" "Working together" "Helps you to get to know people"	"We wanted to choose own group" "It was different because you weren't working with friends" "We should swap groups after every challenge"
Peer leader Relationships	"Working with a year 10 leader was good as they are not so cranky and are different to teachers" "Because the Year 10's are closer to age group…easier to connect to" "Lots of positive feedback from the leaders"	
YEAR 10 RESPONSES (n = 7)		
Activity/Program	"It was fun and exciting" "Everyone had fun" "It was mostly good" "It was great, except I missed the second session"	"That it was at the end of the day" "Packing up" "Filling out surveys"
Team Work	"Getting to work with and help the Year 7's" "It was something new…I got to work with people who I wouldn't normally" "Helping out the Year 7's"	"Some of the girls (Yr 7's) were a bit lazy to begin with"
Peer leader Relationships	"Being with the girls" "Communicating with the Year 7 girls and getting them motivated"	

In terms of active participation, researchers noted that Year 7 participation increased following the first implementation (n = 28) where three of six non-participants sat themselves out prior to commencing the activities. There was a different atmosphere during the second implementation (n = 31) when students were anticipating the next 'challenges'. Only one student was sitting out due to an injury, the other two students were absent from class. It was evident throughout three 'challenges' that students were engaged, working as a team and actively completed laps of the racetrack by either running or walking fast. Only one student decided not to take part in the final 'challenge' activity.

ii) Year 10 Peer Leaders

All seven peer leaders who completed the training and implemented at least one 'challenge' completed the program evaluation. One peer leader was only available for the training and did not implement any 'challenges'. As per Year 7, responses were themed (Table 3). To summarize the findings reported by peer leaders, the activities were perceived as fun. However, some aspects such as filling out surveys, the time of the day when delivered and packing up were small process issues which detracted from their enjoyment. Nevertheless, the experience of being peer leaders was underpinned by their enjoyment of being and communicating with, and helping the Year 7 students.

iii) Teachers

Both Year 7 physical education teachers were asked to respond to a series of questions relevant to the outcomes of peer leader preparedness, activity participation and suitability. Their responses have been compiled (Table 4) and highlight the suitability of the activities for motivating students to participate. The program also assisted in drawing attention to components of the activities that should be further considered; competitiveness, student groupings, timing of the activities in the school year, and engaging otherwise disengaged students.

Table 4 Physical education teacher responses to the GLAMA programs' ability to meet the primary outcomes

Teacher Responses	Leadership Preparedness	Activity Participation	Activity Suitability
Teacher (1)	"It was definitely beneficial having the year 10 students involved….younger students looked up to them and I think they almost wanted to prove themselves to them, to show them that they were capable of being mature and capable of performing skills. It was fantastic to see the Year 10's step up and take on a leadership role within the school." (1)	"During the first session we saw many of the students who do not usually participate having a go at all the activities (which was a big positive)…..students worked well with students who they do not usually work with…enthusiasm and confidence increased. We saw some of the 'typical' non-participants pull out half way through activities during the second session.	"A program like this would be extremely beneficial for year 7 girls at the start of the year as many of the students would not have formed close friendships yet…..give students a chance to work with everyone in a positive team environment. In addition…….this allows students who are not so confident or do not like

		This could have been due to a decline in confidence as some of the activities were harder than the previous week's activities." (1)	physical activity to participate in physical activity without even knowing it. Students such as this may see physical activity as a positive and fun thing rather than an exhausting task." (1)
Teacher (2)	"…Year 10 students seem to engage the Year 7 students. They were able to get students who don't normally participate to have a go, which was great to see." (2)	"Team work was one aspect that I think improved (through participation) as well as developing new friendships." (2)	"I would consider continuing on; it's just a matter of getting our hands on the right resources." (2)

Results for the dimension ADOPTION

The physical education teacher who recruited the Year 10 peer leaders and completed the training with leaders was highly motivated in terms of implementing the GLAMA project. The two Year 7 physical education teachers were also supportive of the project. However, factors which hindered their full involvement included: a deficiency in knowledge of program development, program structures and implementation procedures. Other factors that may have influenced adoption were the schools extra curricula programs that occurred simultaneously and included another external leadership opportunity, sports team commitments, academic testing and workplace experience. Timetabling priorities also affected the first assisted implementation, with class time reduced to facilitate a presentation assembly.

Results for the dimension IMPLEMENTATION

The pilot school implemented most components of the program. Factors limiting the implementation process included;

- Peer Leader availability: Seven peer leaders completed the first assisted implementation and only five leaders were available for the unassisted implementation. Absences were due to sporting team commitments, external school courses, workplace experience and other school programs (Figure 2).

- Year 7 participant absences: Absences were due to illness, sporting or other school commitments such as music lessons (Figure 2).

- Duration: Initially the pilot was designed over a 6 week period. This was to include 2 days of leadership training in the first week. This was to then be followed by four "in class" sessions for 65 min per week over a 4 week period (4×65 min). It would then conclude with the lunchtime sessions, one lunchtime session of 40 min per week for the duration of 2 weeks (2×40 min).

However, the school would only release the Year 10 leaders for 1 day of training. Additionally, it was decided between staff and researchers that the four single sessions could be provided in two double sessions, therefore including the exact same content but over a shorter duration (2 weeks rather than four weeks). Circumstances beyond the control of the researcher reduced one double session to only one single session.

The peer leaders were very reluctant to give up their time to commit to a program over a total of 6 weeks but were happy to do so over a lesser time frame. The peer leaders also considered their lunchtime as an important period of the day and therefore after discussions with them it was decided to remove the lunchtime component. Year 7 students when asked also suggested their own time to socialise at lunchtime was more important than participating in the program.

- Team selection: In this pilot program teams were selected by teachers prior to the program. However, one teacher noted that *"...perhaps, teamwork declined a little in the second session as some of the students believed they should have been given the opportunity to work with their friends..." (Teacher 1).*

- Time and cost of intervention: All three 'challenges' involved equipment that was sourced from around the school and from the physical education resources already available. The main cost was in student time taken away from class. For the peer leaders, classes missed had to be made up in their own time. For Year 7 students, because it was during curriculum time the impact was minimal.

- Time of year for implementation: The program was implemented toward the end of the school year when friendship groups have already been established in Year 7. Year 10 peer leaders also had competing demands of preparing for exams.

Results for the dimension MAINTENANCE

As this was a pilot intervention, maintenance was difficult to evaluate because of the short duration. However, a positive result was reported by physical education teachers at the intervention school during December 2010. Of the leadership group who completed training, seven of the eight Year 10 peer leaders continued their leadership at the school and were peer support leaders for the Year 7 students the following year.

A review of outcomes including the potential barriers and possible solutions to enable successful implementation and dissemination of this project in the future can be found in Table 5. The three main considerations that need to be addressed and were evident across more than one RE-AIM dimension include:

i) Developing teacher, school and student participation.

ii) Translation of leadership training.

iii) Consistent activity implementation.

Table 5 Potential barriers and solutions for GLAMA intervention using the RE-AIM health promotion evaluation framework [32]

DIMENSION	POTENTIAL BARRIERS	POTENTIAL SOLUTIONS
Reach	***Future implementation of a school intervention of this design must consider the following to best target individual participants and school settings:***	
S	1. Implementation during school curriculum time.	Engage schools in program implementation during curriculum PE or Sport Education or potentially as an adjunct to 'Peer Support' Year 7 mentoring programs that many schools already provide. Students may not want to participate during their own free time such as lunchtime.
S	Have support and develop knowledge of the program with all teaching staff.	1. Develop support from school and staff by providing appropriate professional development and handout information prior to implementation. Must highlight benefits to staff and students of their own participation.
S	2. Ensure program is not competing against other school based programs for time.	2. Consult school calendar and highlight benefits of program for school transition, school connectedness, and psychosocial development.
LT	Recruitment of leaders may need a different approach.	3. Program needs to be promoted as an opportunity not a right; therefore incentives may not be needed. Leaders need to be aware of benefits. Link to community service programs such as Duke of Edinburgh is possible. There also needs to be consideration of recruiting leaders who are not already involved in similar opportunities and who sit outside the traditional 'leader' mould.
LT	3. Return of consent forms may be an issue.	If considered a 'compulsory' program by the school and fully supported, there may be a higher return rate of consent forms.
Effectiveness /Efficacy	***Consideration of the following will be needed to ensure leader competency, confidence and preparedness:***	
LT	Training protocol.	**OUTCOME 1: Leadership training and leader preparedness.** 1. Training programs should be clearly designed to meet appropriate outcomes to ensure that it will enable successful implementation of the interventions. Leaders should gain knowledge in the five key areas established in this pilot.
LT	Training duration.	2. An intervention that is implemented over a longer duration would

		require more training to be able to conduct more 'challenges' and greater understanding of group dynamics, leadership skills and how to problem solve. Refresher training just prior to the first implementation should be undertaken to help check for understanding and address any concerns or apprehensions.
LT	Length of time between sessions.	3. 'Challenges' should be completed weekly to ensure a consistent team oriented approach otherwise leaders lose momentum and also understanding of tasks and their role.
LT	Reading and comprehending instructions for each activity.	4. Provide a booklet with all 'challenges' for leaders to take home and use to prepare. Ensure activity cards are clear and concise with diagrams and that leaders have opportunities to clarify before implementation.
LT	5. Opportunities to evaluate training and verbal feedback.	5. Leaders should be given the opportunity to provide both written and verbal feedback to help direct support they require to develop their leadership skills.
	The following issues need to be addressed when providing activities for Year 7 students:	
A	Sequencing activities correctly to engage students.	**OUTCOME 2: Activity suitability and participation** The first task completed should be challenging, engaging and provide an opportunity for students to contribute to team success.
A	Removal or adaptation of racetrack.	The racetrack element should be carefully considered in terms of its: length, application in more cognitively based activities to encourage activity, its benefits to leader organisation, its location and participant understanding of its purpose, how frequently it is used and the primary outcomes of the program challenge.
A	Adding competitive elements.	Scoring should be consistent between activity 'challenges', easy to use and fully explained in the activity cards and booklets leaders have.
A	Grouping of students in teams	Appropriate grouping of teams and also leaders to teams is paramount to intervention success and should be considered carefully. If leaders are working with other leaders, this should also be considered. Teams should be small, between 4 to 6 students if possible.
LT	Leader interest and understanding of activities and ability to motivate students.	1. Leader motivation and interest will be critical to Year 7 activity participation. All leaders should apply for positions of responsibility and

		potentially demonstrate they have the capacity to undertake this role. Leaders must complete training that promotes positive relationship building, communication skills, problem solving and ability to work with others in groups.
A	Disappointment in team/grouping.	2. Inappropriate grouping may lead to decreases in participation. Year 7 groups and students should be monitored throughout the program with groups confirmed as early as possible if changes are required.
A	Concern about being part of a losing team.	7. Bonus points can be given by supervising staff to leaders and teams for assisting with equipment, organization and appropriate 'team work' to reward desirable team related outcomes.
A	8. Time to complete the activity.	Time periods must be designated for each challenge and be consistent throughout the program. This will allow scoring to also be consistent between activities.
Adoption	***The following issues need to be addressed to promote setting adoption:***	
S	1. Teacher knowledge and support of the program.	See REACH 1.
S	2. School culture including previous lack of success with students, motivational issues with students and negative experiences with physical activity.	1. The program should be promoted to all students, with leaders comprehending the importance of the role they will play. Motivational issues and negative experiences with physical activity can be negated by limiting racetrack lengths, careful team selection, ensure leaders are motivating and encouraging and appropriate challenge activity selection to meet student needs.
S	Too many extra curricula activities already offered by the school.	1. See REACH 3.
Implementation	***To encourage successful implementation of this intervention, the following components need to be considered:***	
S	Leader availability for each session.	1. A consistent time every week needs to be provided for both leaders and students to ensure they attend, can plan for and contribute to each session. If leaders are absent, it impacts greatly on their peers and also other teams.
S	1. Participant contribution to team each session.	2. All participants should be held accountable for their team success after each challenge. This could be in the form of contributing individual points or overall team points. Teams crossing the finish line together and

		presenting to leaders together is also an important component in achieving this.
S	2. Consent.	3. See REACH 4.
S	3. Length of program and training within the school program.	4. The training duration provided for leaders has to equate to the period of implementation.
S	Team Selection.	5. See EFFECTIVENESS Outcome 2, 4.
S	Time and cost.	6. The outlay for equipment is minimal. The time taken for leaders to leave their classes to conduct the program is the most costly aspect of the program. Potentially timetabling a Year 10 and Year 7 class together for PE, Sport Education or Peer Support may alleviate this. Otherwise, classroom teachers need to be informed of when leaders will be missing and provide appropriate avenues for them to make up class time.
S	The time of year to deliver program the program to Year 7 students (weather, transition, exams, sport).	One of the aims of the program is to assist with Year 7 transition and therefore the optimum time for delivery is Term 1 or Term 2 of the school year. Optimal training time for leaders also needs to be taken into consideration, with exams and other commitments sometimes filling senior students' diaries. Weather will also impact on location/facility requirements.
Maintenance	***For a school to maintain a program and embed it within the school, the following parameters should be addressed:***	
LT	The duration of training and when to deliver the training.	1. A comprehensive training program should be undertaken to ensure leaders are competent and capable in leading their Year 7 teams. Provision of training periods should be included within the school day. The timing of training should also be considered otherwise refresher training will need to be provided. If the program is to be delivered at the start of a year, consideration needs to be given to leader selection and training beginning at the end of the previous year (see also EFFECTIVENESS Outcome 1, 2).
S	Impact on school having both year 7 and year 10 students participating in program.	All Year 7 students should have opportunities to partake in the 'challenges'. The biggest impact will be on Year 10 students who will have to miss classes if classes are not timetabled concurrently.
S	Staff required.	Staff training is required for those staff that will be assisting Year 10

	leaders when the program is actually running. This will enable them to provide valuable feedback while the student leaders implement the program. Recruitment of key staff that will help drive and oversee the intervention is crucial to its success. Ongoing training of new staff to a school setting is necessary.

Potential barriers include those relevant to: S staff and school, *LT* Leadership training, *A* Activity/program design, selection or participation

Discussion

Overall engagement of the school, teachers and students was appropriate during the pilot. All teachers attended each session, there was an increase in Year 7 participation over the three 'challenges' and the lowest attendance by peer leaders was five of the available seven students during week three which was affected by external school activities.

Over a longer duration, gaining teacher and administration support in a school setting is imperative for intervention sustainability. Similarly to previous studies, we have found that having a 'program champion' to develop momentum and drive the program from within the school has shown to be influential in the success of school-based interventions [45,46]. Importantly, in conjunction with appropriate staff training [46,47], it can maximize opportunities for all involved and possibly enable the project to become embedded more broadly within the school culture.

For this peer assisted intervention to be successful it must be provided within timetabled lessons, and possibly collaborate with other programs with similar objectives (promote school and social connectedness, foster leadership, increase physical activity). Secondary school intervention studies such as Trial of Activity for Adolescent Girls (TAAG) [48] and Fitness Improvement Lifestyle Awareness (FILA) [26] have similarly found that the compulsory context of curriculum-based sessions are important in enabling greater opportunities for intervention success. It was evident in both our study and FILA [26] which involved peer assisted learning, that competing interests at lunchtime may impact on participation.

Supporting the developmental concepts of this pilot intervention, a recent systematic review of interventions that promote physical activity among young and adolescent girls' recommends that peer assisted learning strategies such as mentoring or tutoring should be one focus of future physical activity research [49]. Although the aim of the pilot was to specifically elucidate the effectiveness of the training for Year 10 leaders, the activities used with the Year 7 students and to see if there were any immediate barriers to the program within schools, it would be remiss to not address the fact that previous research has demonstrated the capacity to measure a range of different outcomes in peer learning contexts and these will need to be considered in the future implementation of the GLAMA program over a longer timeframe. These measures include physiological [20-24] as well as psychosocial outcomes [16-19,23,24]. Objective measures of physical activity for leaders and Year 7 students would be highly beneficial and relevant to the future implementation of the intervention.

One of the limiting factors of many peer assisted learning interventions is the integrity of the leader training protocol and whether the training provided to leaders is sufficient to secure the desired outcomes of the program [27]. We have found our training to be somewhat successful after assessing researcher and teacher observations as well as peer leader evaluations, although completing the implementation of three 'challenges' is not a true reflection of training success. Importantly, gathering support from students to complete the training and engage in the intervention also needs further consideration. Physical activity, peer assisted learning, or leadership opportunities are not attractive to all teachers or students. Further strategies would need to be considered on how to address these perceptions. Research has suggested that incorporating peer leaders to deliver interventions may possibly reduce the burden on teachers and may also promote responsibility in peer leaders and a greater

understanding of the program resulting in higher retention [25]. These outcomes may be important for program champions to disseminate.

The design of the activities must provide opportunities for development across each of the learning domains: affective, cognitive and psychomotor. Supporting previous findings from the HIKCUPS study [50], our research has shown that detailed activities, equipment and the time for activities should be clearly available in manuals to clarify any difficulties peer leaders may have. These manuals should be provided for leaders in the future. Furthermore, recommendations from HIKCUPS also highlight that the selection of activities need to be engaging as well as health promoting [50]. Our findings concur, activities need to be carefully sequenced, provide competitive elements which participants reported they enjoyed, involve careful team selection and have clearly defined, consistent scoring, and time periods during individual sessions as well as the entire program.

Limitations

Process evaluations are important components of intervention research [48]. The RE-AIM health promotion evaluation framework was used in this evaluation and has identified a range of different outcomes and limitations that should be considered prior to further implementation and dissemination of the GLAMA program. Firstly, the school chosen was rural, and despite being similarly ranked with two thirds of other schools within the Victorian state secondary system, the influences on rural students' participation in such programs may be different to their metropolitan counterparts. The sample of eight female leaders who undertook training and seven female leaders who implemented the project also limits external validity.

The use of self report lends itself to reliability issues, memory bias and problems with concentration and comprehension [4]. In an attempt to overcome these problems, questionnaires were completed immediately after training, program implementation and program completion. Timetable restrictions dictated timeframes for completion of tasks and may have influenced results; however, this is the reality of conducting interventions in school settings.

The duration of the intervention for 3 weeks does not provide knowledge of the long term difficulties within the setting and with participants to be fully understood. Although not the primary objective of this process evaluation, it also did not enable us to assess any immediate behavioural change in peer leaders or Year 7 girls, which is something interventions of a longer duration would need to consider.

Conclusions

Despite barriers experienced by students and teachers at an individual level, the factors having the greatest impact on intervention success are those coming from within the school setting; the structure of the curriculum, timetabling, pressure to meet curriculum and assessment content, lack of support for new initiatives, multiple programs already running within the school, time allowances for teachers, appropriate training for teachers, and support of students to participate. A school's ability to adopt, implement and maintain programs needs to be considered most prominently in planning future implementation of school-based physical activity interventions [5,51] as well as those within other curriculum areas.

The GLAMA pilot intervention provided opportunities for leadership development, physical activity and social interactions for participants, all of which can be measured in its future application. Overall, it was a positive experience for Year 10 leaders, Year 7 girls and physical education teachers. The intervention should be revised using the recommendations from this study to further encourage a range of other school settings to adopt such programs, and considerations should include promoting involvement to both boys and girls in a cross-age environment over a longer duration.

Competing interests

None

Authors' contributions

KJ contributed to the conception, design and implementation of intervention methodology, acquisition of data, analysis and interpretation of data, drafting, critical review and final submission of manuscript. AB contributed to the design of intervention methodology, acquisition of data, analysis and interpretation of data, drafting, critical review and final submission of manuscript. GN contributed to the design of the methodology, critical review of manuscript and final submission of manuscript. All authors read and approved the final manuscript.

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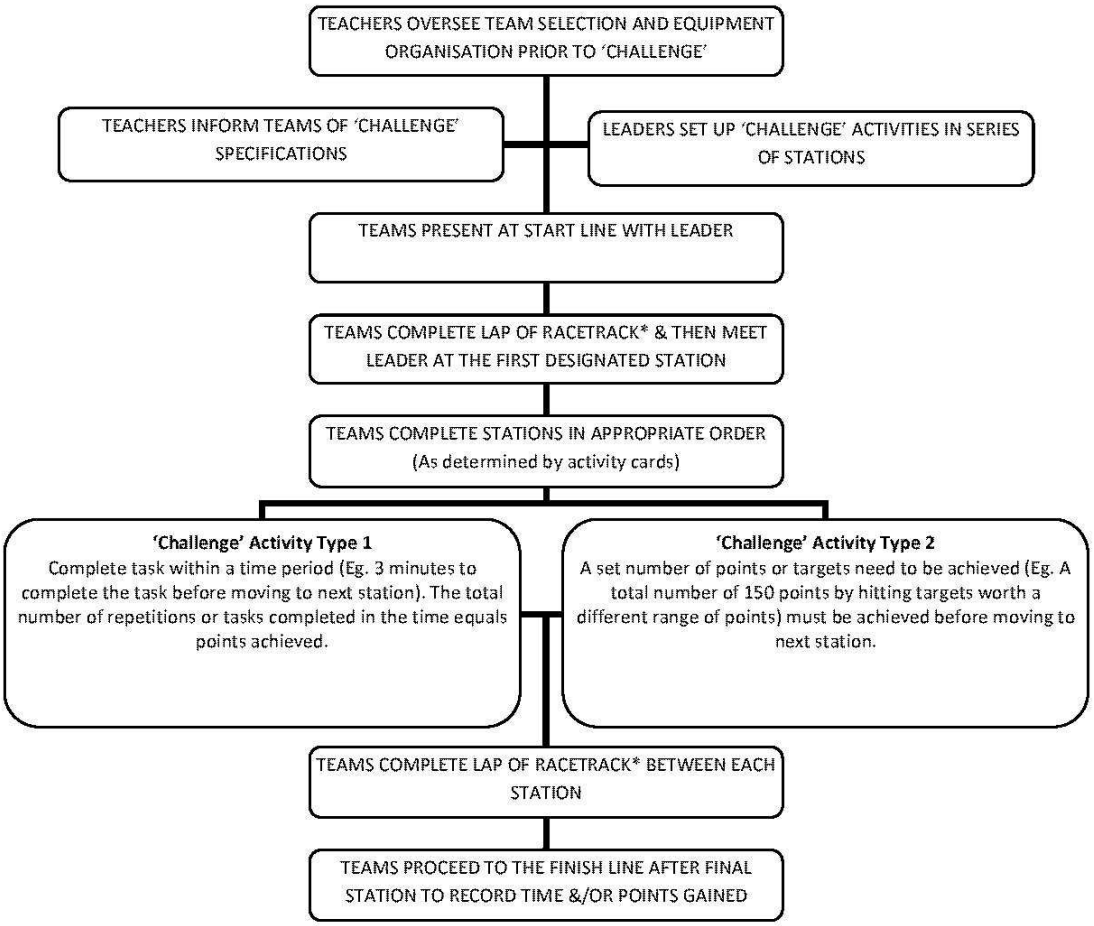
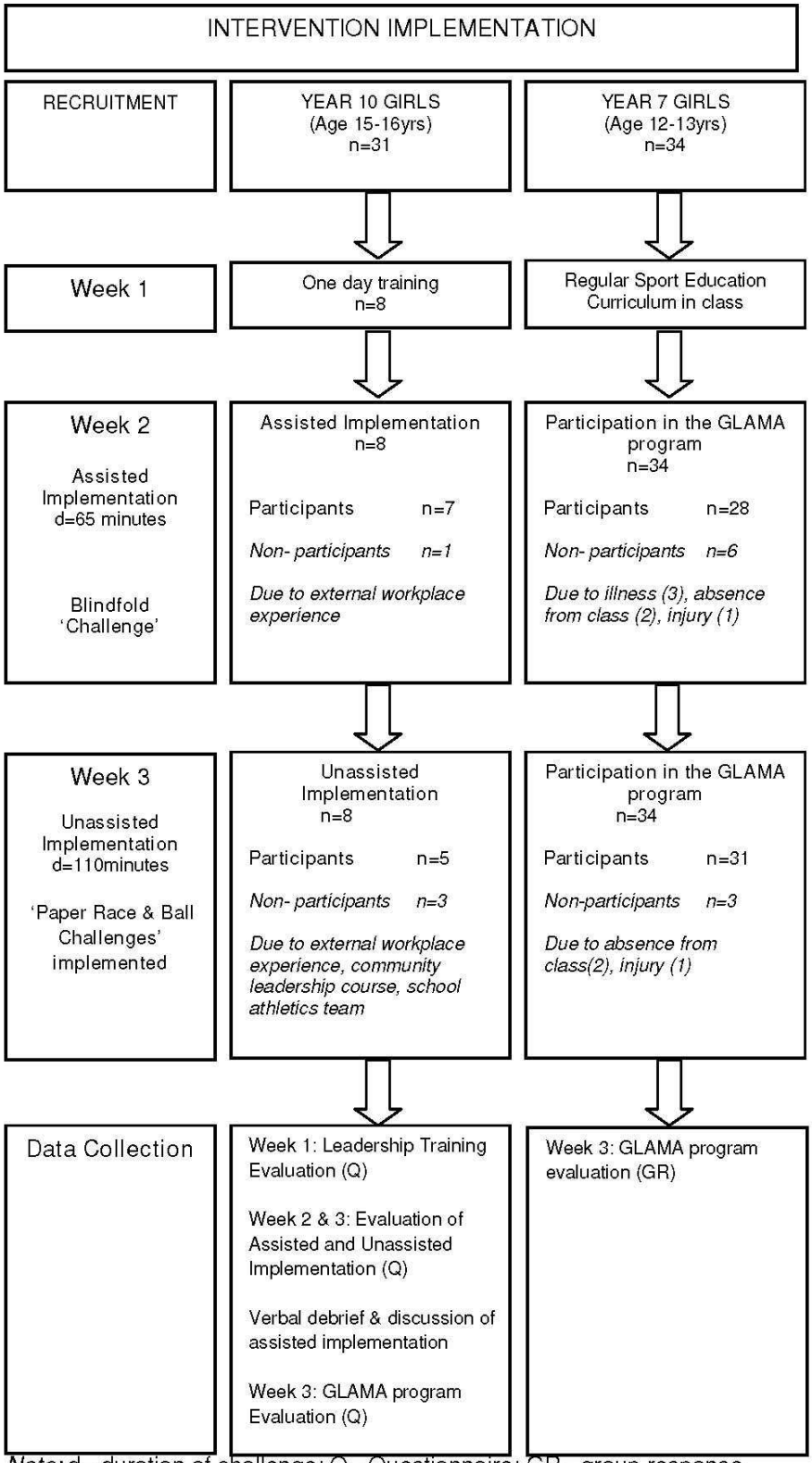


*Note: *Racetrack is a circuit of approximately 20-30metres in distance. Its intention is to provide the leaders time to move to the next station and prepare for their teams arrival when they need to explain the next task. The racetrack also provides additional physical activity between each station which is important during the more cognitively directed challenges.*

Figure 1



Note: d= duration of challenge; Q= Questionnaire; GR= group response

Figure 2

APPENDIX A: PUBLISHED PEER-REVIEWED JOURNAL ARTICLES

3. **Jenkinson, K. A.** & Benson, A. C. (2010). Barriers to providing physical education and physical activity in Victorian state secondary schools. *Australian Journal of Teacher Education,* 35(8), 1-17.

Australian Journal of Teacher Education

Barriers to Providing Physical Education and Physical Activity in Victorian State Secondary Schools

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Abstract: An on-line questionnaire was completed by 115 physical education teachers to establish the barriers to their implementation of physical education in Victorian state secondary schools. In addition, the barriers perceived by teachers to impact on students' participation in school-based physical education and physical activity were examined. The barriers to the provision of physical education were found to be largely institutional, although two-thirds of respondents recognised their own difficulties in engaging students when teaching as potential obstacles to student participation. Students were also perceived to be influenced by their own (45 per cent) and their peers (62 per cent) low levels of interest when choosing to participate. An awareness of these barriers has implications for physical education teaching, curriculum design, teacher training and adolescent participation in the school environment.

Introduction

With exercise and activity habits commencing early in life and the development of healthy lifestyle behaviours among children and adolescents translating into reduced health risks in adulthood (Dobbins, De Corby, Robeson, Husson, & Tirilis, 2009), quality education at an early age is paramount. Hence, schools have been identified as key health settings and are being called upon to give greater attention to their physical education and physical activity programs (Naylor & McKay, 2009; Pate et al., 2006).

The combination of the decline in fitness standards of young people, high drop-out rates, and inadequate pathways to accessing physical activity (Hardman, 2008) and the substantial increase in the prevalence of overweight and obesity among children and adolescents around the world (Eisenmann, 2006) undoubtedly equates to a growing concernTherefore, it is not only schools that have been identified as having a key role to play, but it is also apparent that physical educators are becoming more accountable than ever before as their role continues to evolve and they pursue opportunities to facilitate activities that engage students and provide education on lifestyle choices and healthy behaviours. Schools are learning environments with the capacity to equip students with these attributes; however, it is the quality of the programs in schools that will ensure that young people are given the opportunities to

become physically-educated individuals (Lee, Burgeson, Fulton, & Spain, 2007). The provision of quality physical education curriculum can be affected by many factors, some of which can assist or hinder delivery and participation.

Literature

Institutional and Teacher-related Barriers to Physical Education Provision

Barriers within schools that restrict teachers providing physical education programs have been classified by Morgan and Hansen (2008) as being either *institutional* (outside the teachers' control) or *teacher-related* (arising from the teachers' behaviour). The simplicity of this classification enables it to be applied to both primary and secondary school settings.

Previous research has highlighted many *institutional* barriers including budget constraints, scarce resources, reductions in time provisions in the curriculum, the absence of professional development, the crowded curriculum itself and the lack of facilities and equipment (Commonwealth of Australia, 1992; Hardman, 2008; Le Masurier & Corbin, 2006; Morgan & Hansen, 2008). Similarly, Dwyer et al. (2003) reported that the lower priority given to physical education, the absence of performance measures for physical education and activity, and insufficient infrastructure were the three major *institutional* barriers identified by generalist elementary teachers in Canada to the provision of a curriculum that was capable of meeting the health and physical education guidelines.

Most *teacher-related* barriers have been reported in primary school studies (Barroso, McCullum-Gomez, Hoelscher, Kelder & Murray, 2005; DeCorby, Halas, Dixon, Wintrup & Janzen, 2005; Dwyer et al., 2003; Morgan & Hansen, 2008). The barriers described include possessing low levels of confidence or interest in teaching physical education, being unable to provide safely planned and structured lessons, having had personal negative experiences in physical education and lacking training, knowledge, expertise and qualifications to provide physical education (De Corby, Halas, Dixon, Wintrup & Janzen, 2005; Morgan & Bourke, 2005; Xiang, Lowy & McBride, 2002).

The comprehensive primary school-based findings reflect not only the lack of research across the secondary levels in schools, but could possibly be attributed to both secondary and specialist primary school teachers having dedicated physical education units as part of their training. This specialisation should equip teachers with the skills to overcome barriers more easily and enable them to plan and implement programs accordingly.

A summary of *institutional* and *teacher-related* barriers to physical education and physical activity that compares primary and secondary school environments can be found in Figure 1.

Barrier	Primary Schools	Secondary Schools
Institutional	Access to and lack of facilities [1, 7] Lack of time [1, 7] Crowded curriculum [7] Funding [1, 7] Access to and lack of equipment [1] Support from other staff [1] Support from administration [1, 7] Access to professional development [7] PE/Sport not priorities in school [1, 5] Large class sizes [1, 7] Budget constraints [7] Insufficient infrastructure [5] Other teaching priorities [1, 5] Quality of facilities [1] Level of professional development [7] School executive attitudes toward PE [1] Insufficient number of PE staff [1, 5] Lack of performance measures for PE [5]	Access to and lack of facilities [6] Lack of time [2] Restricted curriculum [2] Funding [6] Ethos of PA for life within the school [2] Socioeconomic status of school [3] Timetabling [6]
Teacher-related	Lack of training and knowledge [4] Difficulty of providing safely planned and structured lessons [4] Gender stereotyping of activities [4] Poor planning [4] Perceptions of the value of PE [4] High level of accountability for other subjects [5] Confidence in teaching PE [7, 8, 12] Interest in/enthusiasm for PE [7] Personal school experiences in PE [7, 8] Attitudes toward PE [5] Expertise/qualifications [7, 8, 12]	Colleagues undervaluing activities [2] Ethos of performance/élitism of PE department or school as a whole [2]
Student-related	Lack of student engagement [9] Expressed dislike for activity [9] Lack of intrinsic and extrinsic motivation [9] Intrapersonal barriers [11]	Student engagement [6] Lure of sedentary behaviour [2] Low fitness levels therefore potentially lower ability [2] Socioeconomic status of student [3] Levels of encouragement and motivation [3] Peer support [3,10] Peer pressure [10] Intrapersonal barriers [11] Lack of motivation/laziness [11]

Note: PA = physical activity; PE = physical education; Sport = sport education.
[1] Barroso, McCullum-Gomez, Hoelscher, Kelder, & Murray, 2005; [2] Boyle, Jones, & Walters, 2008; [3] Dagkas & Stathi, 2007; [4] DeCorby, Halas, Dixon, Wintrup, & Janzen, 2005; [5] Dwyer et al., 2003; [6] Dwyer et al., 2006; [7] Morgan & Hansen, 2008; [8] Morgan & Bourke, 2005; [9] Mowling, Brock, Eiler & Rudisill, 2004; [10] Salvy et al., 2009; [11] Sherar, Gyurcsik, Humbert, Dyck, Fowler-Kerry & Baxter-Jones, 2009; [12] Xiang, Lowry, & McBride, 2002.

Figure 1: Barriers to the delivery of physical education (PE) and physical activity (PA) programs to primary and secondary school students

Student-related Barriers to Participation in Physical Education and Physical Activity

In contrast to the barriers experienced by generalist teachers, a recent study from the United Kingdom investigated heads of physical education and heads of schools' perceptions of barriers to providing physical education and physical activity in secondary school environments (Boyle, Jones & Walters, 2008). Despite reporting

some *institutional* and *teacher-related* barriers similar to those found in the primary school studies, Boyle, Jones and Walters (2008) also found that teachers perceived some *institutional* and *teacher-related* barriers similar to those found in the primary school studies, Boyle, Jones and Walters (2008) also found that teachers perceived that students were lured by the greater availability of sedentary opportunities and consequently suggested that lower levels of fitness and lower physical ability in students might be impacting on both delivery and participation in physical education and physical activity. Therefore, further consideration of other barriers in secondary schools that inhibit the delivery of and students' participation in physical education is warranted; *student-related* barriers are further obstacles that teachers must be able to plan for and overcome when providing educational opportunities for students.

Previous research on children's and adolescents' self-reported barriers to participation in physical education and physical activity has reported changing attitudes to activity and physical education, adolescents' decision making favouring more sedentary activities, the importance of peer pressure or desire for peer approval when choosing activities, the changing fitness levels of students, student unwillingness to participate, a dislike of activity, a lack of understanding of the benefits of physical activity and a decline in student interest (Boyle et al., 2008; Commonwealth of Australia, 1992; Dagkas & Stathi, 2007; Sherar et al., 2009; Trudeau & Shephard, 2005).

The barriers to student learning and participation may in part be explained by social cognitive theory (Bandura, 1986), which highlights the relationship between cognitive, behavioural and environmental factors that influence an individual's choices, including those relating to physical activity behaviour. These three factors are not independent, but are mutually dependent and all influence learning and activity choices within a host of contexts. Due to the large amount of time dedicated to schooling, students are influenced greatly within the school environment by many elements, including their teachers, their peers, the programs provided, their participation in classes and their engagement in curriculum and extra or co-curricular activities. The interaction and influence of all three factors on preferred behaviour is certainly most evident at the secondary school level, where adolescents begin to cement their own attitudes and beliefs regarding physical activity. A summary of *student-related* barriers is included in Figure 1.

The benefits of participation in physical education are numerous and have been highlighted by Bailey et al. (2009), who categorise them as being physical, lifestyle, affective, social, and cognitive. However, it becomes increasingly difficult to provide quality physical education and physical activity opportunities in schools when constrained by many *institutional, teacher-* and *student-related* barriers.

The majority of previous research has focused on primary schools therefore, it is important to understand the barriers to physical education and physical activity provisions in secondary schools more clearly. The limitations identified by teachers responsible for providing school-based opportunities need to be examined, as an understanding of these barriers is essential to making improvements and developing quality physical education programs in secondary schools, both now and into the future.

The purpose of this study was (i), to investigate the barriers experienced by physical education teachers that influence their provision of school-based physical education and physical activity in Victorian state secondary schools; and (ii), to determine the teachers' perceptions of barriers that students experience in accessing physical education and physical activity opportunities in their schools.

Method

Recruitment

Some 270 state secondary schools (Year 7-Year 12) and preparatory to Year 12 state schools were considered as potentially providing participants for the study. Thirty-eight schools that did not:

- provide physical education programs;
- provide programs across the Victorian mandated levels of physical education (Year 7- Year 10);
- report on VELS (Victorian Curriculum and Assessment Authority, 2008) levels as required by the Victorian Department of Education and Early Childhood Development (DEECD); or
- provide physical education programs that did not require combining classes across multiple year levels,

were excluded, resulting in 233 schools being contacted and invited to take part in the study.

Schools representative of metropolitan, rural and remote demographic areas as defined by the DEECD were included. Prior to the data collection, the DEECD required that all eight Regional Education Directors be informed of the study, and this was sent by fax or email. The database of schools' contact information was established by viewing regional databases or individual schools' websites. Principals of each school were then informed via email of the on-line questionnaire and were asked to forward relevant details to the Physical Education heads of department. These heads of department were also individually emailed and were asked to make their physical education staff aware of the questionnaire and encourage them to complete it.

After the initial four-week recruitment period, further reminders were emailed to all Physical Education heads of department and physical education teachers. Schools that had not responded to the questionnaire after four weeks were also mailed letters in an attempt to enlist their participation. The collection period totalled eight weeks.

Questionnaire

The on-line questionnaire was administered between October and December 2008. Ethics approval was obtained from RMIT University and the DEECD. Piloting of first a printed questionnaire and then the on-line version of the same questionnaire was undertaken to enable any difficulties associated with the format and instructions to be assessed before it was made available to schools. Minor adjustments were made to the layout and structure of the web pages, but no changes were made to the content.

Teachers could complete the questionnaire at their convenience, although internet access was required. The links to the questionnaire, which took approximately 20-30 minutes to complete, were provided in the initial email contact with principals. The format was designed for ease of completion: it included 'yes' or 'no' responses, list selections with 'other' options available, numerical rankings and limited free text responses. When accessing the web page, respondents were introduced to the purpose of the study, the approximate time required to complete it,

access to the Plain English Statement and an assurance that they could remain anonymous should they choose to do so.

Specifically, the questionnaire attempted to gain information relevant to the individual teachers' positions and school demographic information, including size, location, structure, number of staff and priority areas. Teachers were asked to rate the facilities and equipment; the school culture and how physical education was positioned within the school context; and how they thought physical education was perceived by the whole school community, other staff and the management or leadership team.

Participants were asked to rank the most ('10') to least ('1') influential factors that influenced their teaching and the five most significant barriers that they perceived restricted their students from being active inside the school from most ('5') to least ('1') significant. Finally, teachers were asked how they perceived fitness levels of students across all secondary Year levels (Year 7 to senior school). Options included rating students' fitness levels as poor, below average, average, above average or high.

Upon completion, participants were asked to include the last four digits of their six- digit Victorian Institute of Teaching (VIT) registration numbers as a checking measure to ensure all data submitted by respondents were gathered in one data file. Respondents could include their school or personal email addresses, but not including this information did not exclude them from the study or prevent them from completing the questionnaire.

Data Analysis

Analysis consisted of frequency statistics including means, standard deviations and percentages for all demographic variables, the barriers experienced by physical education teachers as well as those perceived by teachers to be experienced by students inside the school environment.

Cross tabs with Pearson's chi square analysis were used to investigate the associations between gender, school size, school location (rural/remote or metropolitan) and the perceived level of respect for the subject of physical education by the school management or leadership team, other colleagues and the whole school community. Perceived fitness levels of students were compared across Years 7 and 8 (n=92, n=92), Year 9 (n=93) and Year 10 (n=91) by location and size of school.

To investigate the strength of these relationships, the standard residual was calculated, with ±1.96 defined as being statistically significant. A p-value of <0.05 was accepted as being statistically significant. Furthermore, ratings of facilities and equipment were also analysed, using Pearson's chi square in an attempt to establish any relationships between teachers' gender, years of teaching experience, school location, school size or position of responsibility held.

There were no missing data from the demographic section of the questionnaire (n=115). Some ranking data sets were incomplete and were therefore excluded from analysis for that aspect. Complete data sets were available from teachers ranking their own barriers from '10' to '1' (n=70) and ranking from '5' to '1' perceived barriers for students inside their schools (n=73). All data were analysed using Statistical Package for Social Sciences (SPSS for Windows, Version 17).

Results

The questionnaire was responded to by 115 state secondary school specialist physical education teachers (male=62, female=53). Of the 233 schools that employed potential participants, responses were obtained from 54 schools, while 35 respondents did not report which school they were from. There were multiple responses from some schools. The mean age range of teachers who responded was 31-35 years. In total, 67 respondents were physical education teachers and the remaining 48 held physical education heads of department positions.

Of the teachers surveyed, 78 per cent held leadership positions as either physical education heads of department or in other leadership roles. Of all teachers surveyed, 32 per cent had 18 years or more of teaching experience, 27 per cent had between less than six months and four years' experience, 22 per cent had between five and eight years' experience, and small numbers had between 9 and 12 years (9.5 per cent) and 13 and 17 years (9.5 per cent) of teaching experience.

Forty-one per cent of teachers taught in schools that had student populations of over 1001; by contrast, 13 per cent of teachers taught in schools with fewer than 200 students. Four respondents were from girls-only schools and the other 111 taught in co-educational schools. Eighty-one respondents taught in schools that were defined as metropolitan, 29 in rural schools and five in remote schools.

Teachers reported a perceived trend of increasingly 'poor' levels of fitness (3-9 per cent from Year 7 to Year 10) and 'below-average' levels of fitness (21-34 per cent from Year 7 to Year 10), indicating that as students get older their level of fitness is perceived to decline. There was a significant association between the location of the school (metropolitan or rural/remote) and the perceived level of fitness at Years 9 ($\chi^2(2)=6.295$, $p=0.043$) and 10 ($\chi^2(2)=8.679$, $p=0.013$). Analysis of the standardised residuals revealed that students in Year 9 ($z=-1.6$) and Year 10 ($z=-1.8$) who attended rural or remote schools were more likely than students in metropolitan schools to be perceived as having 'below-average' fitness levels.

There was a significant association between perceived level of fitness and school size at Year 9 ($\chi^2(2)=11.894$, $p=0.003$) and Year 10 ($\chi^2(2)=8.318$, $p=0.016$), with no associations noted at Year 7 ($\chi^2(2)=0.754$, $p=0.686$), or Year 8 ($\chi^2(2)=2.290$, $p=0.318$). The standardised residuals show that students were more likely to be perceived as having 'below-average' levels of fitness in schools with fewer than 800 students in Years 9 ($z=-2.1$) and 10 ($z=-1.6$) than in larger schools.

Physical Education Teachers' Perceptions of the Status of Physical Education in their Schools

When respondents were asked what their schools' teaching priority areas were, 42 per cent reported that all subjects had equal priority and a further 27 per cent believed that their schools focused on the academic success of their students. A variety of other priority areas were reported by teachers, including english (9 per cent), information technology (8 per cent), mathematics (4 per cent), literacy and numeracy (3 per cent), music (2 per cent) and arts (2 per cent). By contrast, only three per cent of respondents reported that physical education and sport education were the main priority within their school.

Despite most respondents' schools not having physical education as a priority, nearly half (45 per cent) reported that they would rate physical education as being 'extremely' or 'very' important in the whole school community. There were no

significant associations between school size (having ≤ 800 students or ≥ 801 students) and how important physical education was perceived by the whole school community ($\chi^2(2)= 0.235$, p=0.889) or how respected teachers perceived physical education to be considered by the management or leadership team within the school ($\chi^2(2)=3.248$, p=0.197) (Figure 2).

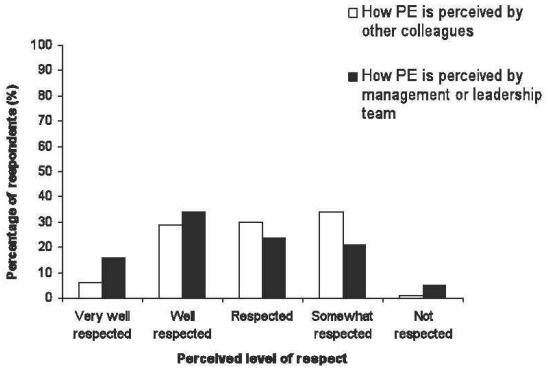

Figure 2:Victorian state secondary school physical education teachers' perceived level of respect for physical education in schools by other colleagues and the management or leadership team

However, there was a trend toward a significant association between school size and the perceived level of respect for physical education by other colleagues ($\chi^2(2)=9.785$, p=0.008). There was also an association between the location of the school (metropolitan or rural/remote) and the perceived level of respect for physical education by other colleagues ($\chi^2(2)=7.347$, p=0.025). Subsequent analysis revealed that teachers in rural and remote schools were more likely (z=-1.7) to report that their colleagues perceived physical education as only 'somewhat' respected or 'not at all' respected.

A significant relationship between the gender of the teachers and their perception of how physical education was viewed by the management or leadership team in the school ($\chi^2(2)=7.192$, p=0.027) was found. The association was most apparent between females and their perceptions that physical education was 'well' respected or 'very well' respected by those in management or leadership positions (z=1.7). There was no relationship between gender and how physical education was perceived to be regarded by the school community or by other colleagues.

Barriers to the Delivery of Physical Education in State Secondary Schools in Victoria

Teachers ranked from most ('10') to least influential ('1') the barriers to their delivery of quality physical education programs. The accessibility of facilities $\bar{x}$=8.10 (2.3) was ranked the greatest barrier to their provision of physical education, with

access to professional development perceived as the least influential $\bar{x}$=3.17(2.19) (Table 1).

Barriers to providing quality physical education (n=70)	Rank order most ('10') to least ('1') important	Mean	SD	Barrier category
Access to facilities	10	8.10	2.30	I
Access to suitable teaching spaces	9	7.95	2.15	I
Access to equipment	8	7.37	2.10	I
Timetabling	7	6.17	2.50	I
Support from other staff	6	5.15	2.56	I
Funding for the subject	5	4.74	2.43	I
Support from management and administration	4	4.17	2.30	I
Leadership from heads of department	3	4.15	2.59	I
Access to professional development that is appropriate	2	4.00	2.13	I
Access to professional development from school management or leadership team	1	3.17	2.19	I

Note: I = Institutional barrier

Table 1: Physical education teachers' ranking of barriers to providing quality physical education (PE) in Victorian state secondary schools

Despite access to facilities being perceived as the greatest barrier to teaching, 81 per cent of respondents rated facilities as 'acceptable' (36 per cent), 'very good' (35 per cent) or 'exceptional' (10 per cent). In contrast to the respondents who were satisfied with their facilities, the remaining respondents thought their facilities were 'barely acceptable' (16 per cent) or 'unacceptable' (3 per cent).

Although access to equipment was the third highest ranked barrier reported (Table 1), 91 per cent of respondents reported that their standard of equipment was acceptable or better, with no teachers reporting having unacceptable equipment. There were no associations found between the rating of equipment or facilities and respondents' gender, years of teaching experience, school location, school size or position of responsibility held.

Perceived Barriers to Student Participation

Teachers were asked to select from a list including an 'other' option and rank the top five barriers they perceived as restricting student participation. These included *institutional*, *student-* and *teacher-related* barriers (Table 2: Figure 3). The crowded curriculum, an *institutional* barrier, was ranked as the most influential by 29 per cent of respondents in restricting students' access to physical education and physical activity in the school environment.

By contrast, the most frequently chosen barrier (ranked most within the top five) by respondents was difficulty in engaging students (67 per cent), with only a third of respondents not ranking it at all within their top five barriers to students in schools accessing physical education or physical activity (Table 2: Figure 3).

Barriers INSIDE school (n=73)	Ranking[a]	Influential barrier					% of respondents ranking barrier in their top 5	Barrier category[b]
		Most				Least		
		5	4	3	2	1		
Crowded curriculum	1	21	6	6	5	5	59	I
Lack of facilities	2	10	7	4	2	4	37	I
Difficulty engaging students	3	9	10	11	11	8	67	T
Students have low level of interest in PE[c] and PA[d]	4	7	11	5	5	5	45	S
Peer pressure	5=	5	7	9	13	11	62	S
PE[c]/Sport[e] not priorities in the school	5=	5	6	5	3	9	38	I
Focus on too many traditional sports	6	4	1	4	5	1	21	I
Past negative experiences with PE[c]	7	3	6	7	6	5	37	S
Large class sizes	8	2	6	7	5	2	30	I
The school environment does not encourage PA[d]	9	2	0	0	3	6	15	I
Cost of subject	10	1	5	8	5	3	30	I
Staff use outdated teaching methods	11	1	2	2	2	2	12	T
PE[c]/Sport[e] staff provide limited activity time	12	1	2	1	1	2	10	T
Semesterisation of units	13	1	1	0	1	3	8	I
Outdated curriculum	14	1	0	0	1	2	5	I
Lack of equipment	15	0	3	4	5	5	23	I

Note: [a]Ranking = based on most frequently ranked as number 1 barrier; [b] I= institutional barrier, T=teacher-related barrier, S= student-related barrier; [c]PE= physical education; [d]PA= physical activity [e]Sport=sport education

Table 2: Perceived barriers to student participation in physical education and physical activity in Victorian state secondary schools: physical education teachers' ranking from most ('5') to least ('1') influential

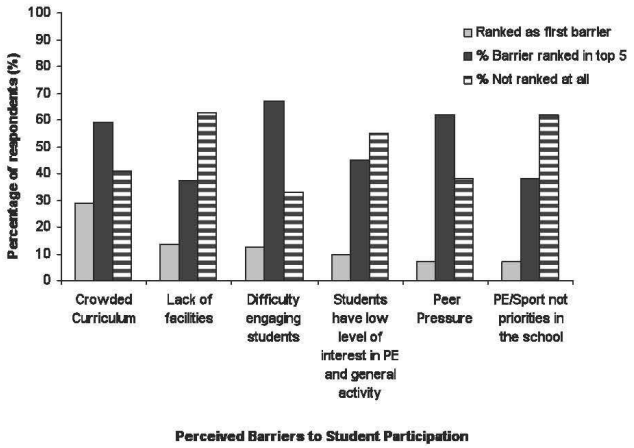

Figure 3: Victorian state secondary school specialist physical education teachers' perceived top five barriers to students accessing physical education and physical activity in schools

Discussion

Schools are well placed to promote health and physical activity behaviours because of the amount of time students spend in this environment and the elements of the school curriculum that are adaptable to include such content. However, barriers experienced by teachers and students and those imposed by the school as an institution are increasingly impacting on the role that physical education plays within schools. We have identified both *institutional* and *teacher-related* barriers that are similar to and complement the many primary school-based studies (Barroso et al., 2005; DeCorby et al., 2005; Dwyer et al., 2003; Morgan & Hansen, 2008). However, this study provides further insights, demonstrating that there are different barriers that teachers may encounter when providing physical education in secondary schools, including those imposed by the students themselves.

The three highest-ranked barriers identified by teachers that specifically affect the provision of physical education are unique to physical education or any learning area that requires additional resources outside the four classroom walls. Access to facilities $\bar{x}$=8.10(2.3), suitable teaching spaces $\bar{x}$=7.95(2.15) and equipment $\bar{x}$=7.37(2.10) were the most highly-ranked barriers, underpinning the specificity of resources that are required in physical education (Table 1). These barriers are also acknowledged as considerable impediments to the provision of physical education in primary schools (Figure 1).

Although *institutional*, these are all barriers that can, if carefully considered (and with good lesson planning and creativity, and departmental support and organisation) be overcome by teachers across all curriculum areas. In large schools in particular (in which many respondents teach), it is important to timetable so access to

facilities is rotated, students experience learning in a range of environments and lessons can be planned appropriately to use the available space most effectively.

Furthermore, if appropriate quantities of equipment are not available, teachers can be creative and improvise activities using similarly shaped or sized pieces of equipment (Mowling, Brock, Eiler & Rudisill, 2004) or, alternatively, network with neighbouring schools to exchange equipment and spaces. It is also essential to investigate local facilities and programs that may add value to school programs, are easy to access and are cost effective. Teachers may be able to build or expand partnerships with local physical activity and wellness communities and create opportunities for students to be active inside and outside schools (Faber, Hodges Kulinna, & Darst, 2007).

Of interest in this study is the finding that over two-thirds of respondents perceived that their own difficulty in engaging students, and therefore their own teaching, could impact on student participation (Table 2; Figure 3). No primary-based studies have comprehensively identified the difficulty experienced by teachers in engaging students in physical education, although Mowling, Brock, Eiler and Rudisill (2004) and Sherar et al. (2009) imply that intrinsic and motivational barriers influence participation at elementary levels (Figure 1).

Tinning (2007) suggests that teachers must know what to do to provide engaging experiences for all young people in physical education. However, their ability to do so is influenced largely by the many factors identified by teachers as *institutional* barriers affecting their provision of physical education, such as a lack of equipment, facilities and teaching spaces (Table 1). Dwyer et al. (2006) and Mowling, Brock, Eiler and Rudisill (2004) suggest it is essential to engage students by developing and evaluating strategies to ensure their interests are met. This necessitates teachers developing activities that are attractive to a wide range of adolescent sub-cultures. Doing so may overcome some of the difficulties and barriers to student participation. However, the simple offering of physical education opportunities that are innovative and well planned may not be enough to engage, excite or encourage participation and may even alienate students (Carlson, 1995). Similarly, Dwyer et al. (2006) also confirm that provision alone is not enough to guarantee participation and engagement.

Teachers claimed that students were responsible in part for their own barriers in secondary schools; a low level of interest in physical education and physical activity (45 per cent) and, more notably, peer pressure (62 per cent) were among the most frequently ranked barriers to participation (Table 2). Mowling, Brock, Eiler and Rudisill (2004) found primary-aged students made connections between exercise, boredom and not having fun in physical education as early as the third grade. Trudeau and Shephard (2005) argue that most young children have a positive perception of physical education, but as they grow older, that perception becomes more ambiguous.

During the transition to and immersion in secondary school, adolescents are often taking greater ownership of their own decisions and attitudes toward both academic learning and physical activity, and this transition itself highlights that different influences will affect their choices to participate, including cognitive, behavioural and environmental factors (Bandura, 1986).

The school environment is a very influential social determinant of physical activity and constant interaction with peers can greatly affect choices, including participation in physical education and physical activity. Salvy et al. (2009) found that peers and friends may promote physical activity and increase motivation to participate. This finding, taken with the views of the respondents in the present

survey, suggests that partner and group work or peer-led activities may be useful in attempting to engage students in physical education and physical activity. Empowering students by offering elective topics, non-traditional activities or initiative games and increasing their role and responsibilities in class with sport education (Siedentop, 1994) can provide positive peer interaction that encourages and promotes activity.

In addition to peer pressure, previously self-reported influences on adolescent physical activity choices have included not being in the mood; lacking energy, motivation, interest or desire; and having other interests not related to physical activity (Allison, Dwyer & Makin, 1999; Dagkas & Stathi, 2007; Kohl III & Hobbs, 1998). Boyle et al. (2008) described teachers' concerns that the limited provision of primary school physical education and play opportunities may be affecting the participation and fitness levels of students as they venture into secondary school. Furthermore, teachers reported that students at secondary school were increasingly being faced with the lure of sedentary behaviour that could lead to lower fitness levels and physical ability and that this in itself might affect participation (Boyle et al., 2008).

In the present study, teachers reported that they perceived students' levels of fitness declined as they got older and consequently there were a decreasing number of students who were perceived to have an 'average' or 'above-average' level of fitness. This trend has also been reported by previous studies (Dollman, Norton & Norton, 2005; Hills, King & Armstrong, 2007; Kohl III & Hobbs, 1998). The significant drop in fitness levels perceived by teachers at the Years 9 and 10 levels, particularly in smaller ($\leq$ 800 students) and rural or remote schools could be attributed to changes in interests or attitudes, a greater focus on academic and career progression, or, possibly, fewer physical education and sport programs being offered at higher Year levels (Jenkinson & Benson, 2009). The implications for teachers of these decreases in fitness levels is quite substantial, particularly as a decline in general fitness in students can often result in a reluctance to participate due to an inability to complete physical tasks.

The crowded curriculum (Table 2: Rank1) and timetabling (Table 1: Rank 7) are symbiotic in their relationship, with one often having a great effect on the other. As early as 1992, the Senate Inquiry (Commonwealth of Australia, 1992), followed by the Moneghetti Report (Directorate of School Education, 1993) identified the crowded curriculum as a major barrier to Australian teachers providing physical education. Kahan (2008) suggests that in primary schools, physical education timetabling may be reduced or even eliminated as it is often deemed a peripheral subject.

Changes to the structure of secondary schooling represent an attempt to meet the needs of diverse populations and ensure that many options are available for all students. However, at times this can be to the detriment of physical education. The identification in this study of timetabling as a barrier may relate to decreases in time allocation, split periods for classes or perhaps too many classes on at once, which means increasing competition for equipment and facilities. Both were considered the biggest barriers to providing physical education in schools (Table 1).

Victorian state secondary schools are required to timetable and provide compulsory physical education from Year 7 to Year 10 (approximate ages 12-16). However, despite this assurance and teachers' concern that physical education should be implemented, this mandate is not always met (Jenkinson & Benson, 2009). This is a notion reported by Hardman (2008) as not uncommon: the gap between actual

policy and implementation is widespread and interests compete for timetable and curriculum space. It is essential that teachers be able to justify why physical education is in the school curriculum (beside the fact that it is 'compulsory') and be knowledgeable about the value of physical education to the school, to students, other colleagues, management and leadership teams and those who make public and school policy decisions (Le Masurier & Corbin, 2006).

Despite ranking many of these components as being less significant (Table 1), to address some of the barriers they rate more highly, physical education teachers must be in a strong position to negotiate, lobby and embed physical education in their schools and school curriculum. Access to professional development, strong leadership and support from all staff is imperative. With colleagues from smaller and rural schools being perceived as having less respect for physical education, a strong understanding of the rationale for physical education becomes imperative.

Limitations

Teacher participation in the present study was conditional on the Principals agreement, who, by forwarding relevant information to heads of department, expressed their consent. The researchers assumed that all schools had access to the internet and that each school's email mailbox was cleared daily and directed to the appropriate people. This chain of communication may have been hampered by technology problems or the failure of someone to pass on information.

A potential limitation of this study is that it obtained self-reported data and therefore teachers may not have accurately represented the physical and sport education programs delivered in their schools. However, obtaining teacher perceptions of their curriculum areas necessitates the utilisation of self-reported data.

Teachers may have tended to claim that institutional or student-related barriers had a greater influence on student participation than their own teaching or decisions made in the physical education department, to avoid reflecting poorly on their teaching or their schools. Nevertheless, teachers' own ability to engage students was rated highly as a barrier to providing quality physical education.

Implications for teacher education

An awareness of these barriers and the impact they may have on day to day teaching is essential for both practicing and pre-service teachers. The following should be considered in pre-service and professional development programs:

- An understanding of the historical aspects and philosophical rationale underpinning physical education are imperative to the ability to negotiate, lobby and embed physical education in their schools and school curriculum.
- Primary training of generalist teachers needs to incorporate physical education units that enable pre-service teachers to develop the confidence and basic skills to plan, provide and promote physical activity. The recognition of how physical education can be integrated across the curriculum is essential.
- Secondary & primary physical education specialists need to understand and critically reflect on the barriers that may be encountered in schools and develop strategies to overcome these. Identifying the impediments they have

control over and those outside their control can potentially lead to shifts in planning, organisation and facilitation of programs.
- Pre-service teachers need to gain experience in a wide range of schools and environments, including independent and government schools with varying levels of administration, equipment and facility access, support for physical education and student and teacher demographics to enable their repertoire of strategies to be practiced and developed.
- Teachers should develop the capacity to draw on diverse models of teaching to provide positive and active learning opportunities for students that cater for all learning styles and develop the cognitive, affective and the psychomotor domains.

Conclusion

Teachers are participants in an institutionalised system influenced by a myriad of complex factors. This research provides evidence that in physical education, which operates outside the traditional classroom, barriers are largely *institutional*. Some of these barriers can be planned for and overcome, but others require considerable negotiation, lobbying and strong leadership: in particular, to gain access to and funding for equipment, facilities, teaching spaces and curriculum positioning.

It is evident that many barriers to providing quality physical education programs have not changed over time: they have merely evolved and become more complex in their own context, in both primary and secondary settings. A focus on addressing *institutional* barriers alone is no longer possible, particularly as teachers report that students are increasingly responsible for their own educational and physical activity choices and, consequently, their participation or non-participation in physical education. A plethora of influences in the school environment now vie for each student's time, attention and participation. The role to which physical educators should aspire involves developing creative, well-planned, engaging and responsibility-focused lessons, and the confidence and ability to do so is recognised by many teachers as a challenging barrier to their own teaching.

Although there are both differences and similarities between the experiences of primary and secondary physical education teachers, an increased awareness of these barriers among teachers at both levels and among practising and pre-service teachers is of vital importance. This awareness will support the continuing development of quality physical education programs, teaching strategies and teaching skills to overcome these barriers, both now and into the future.

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APPENDIX A: PUBLISHED PEER-REVIEWED JOURNAL ARTICLES

4. **Jenkinson, K. A** & Benson, A. C (2009). Physical education, sport and physical activity policies: Teacher knowledge and implementation in their Victorian state secondary school. *European Physical Education Review*, 15(3), 365-388.

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Physical education, sport education and physical activity policies: Teacher knowledge and implementation in their Victorian state secondary school

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Abstract

Despite many worldwide physical education (PE) and physical activity policies targeting children in schools, there is considerable variation between policy and implementation. The purpose of this study was to investigate Victorian state secondary PE teachers' knowledge and implementation of the mandated policy of 100 minutes of PE and 100 minutes of sport education per week across compulsory schooling. An online questionnaire was completed by 115 teachers, 48 percent of whom had correct knowledge of the mandate. Teachers reported compliance to the mandate within their school of between 23 and 33 percent in PE and 2 and 3 percent in sport education across year levels. There were significant associations between school size and reported ability to meet the PE mandate in Year 7 ($\chi^2(1) = 4.46$, $p = 0.035$), Year 8 ($\chi^2(1) = 4.97$, $p = 0.026$) and Year 9 ($\chi^2(1) = 4.24$, $p = 0.039$). In summary, findings suggest that teacher awareness or knowledge of the mandate did not equate to the implementation of policies in schools.

Key-words: mandate • physical activity • physical education • secondary school • sport

Introduction

The primary role of physical education (PE) is to provide education of the physical and through the physical, including opportunities to develop the affective, cognitive and psychomotor domains. It is important to understand the potential PE also has to increase participation, health outcomes and lifelong learning, all of which continue to be current key government policy agendas worldwide (Penney, 2006). However, as Brooker and Clennett (2006) caution, public and societal health issues are complex and require more than just increases in physical activity in PE classes to achieve changes in those at the greatest risk. Hence, the role that PE plays within schools across the world has come to the fore as it can now be seen as potentially assisting in providing a resolution to the decreasing levels of physical activity in children and adolescents in a controlled and safe environment.

It is important to acknowledge that PE is not the only avenue sought as the world attempts to respond to the epidemic of childhood obesity in developed and developing countries (Flynn et al., 2006). The development of physical activity policies is of paramount importance as they also encourage the promotion of activity for certain time periods, intensity and target specific populations (Commonwealth Department of Health and Ageing, 2004; National Institute for Health and Clinical Excellence, 2009; Public Health Agency of Canada, 2009; Sport and Recreation New Zealand, 2007; US Dept of Health and Human Services, 1996, 2008). Of those targeted populations, children and adolescents spend the majority of time at school and as a consequence many school-based sport education, PE and physical activity policies have evolved. Although PE and sport education are closely related and provided within the school environment, they do not share the same goal or serve the same individuals and it is important to distinguish between the two. Sport education seeks to help students become competent, literate and enthusiastic sportspersons (Siedentop, 1994), in contrast, PE is often concerned with developing student physical competence and confidence, and can develop the ability of students to perform in a range of activities (Bailey, 2006). Both are important in developing skills and attributes to encourage participation in physical activity both in and outside the school environment. More recently, physical activity policies have become apparent in many schools and are there to facilitate the promotion of activity and movement both inside and outside curriculum time. Many of these policies in schools are often guided and contested by government and professional PE associations in their corresponding countries (Association for Physical Education, 2008; National Association for Sport and Physical Education, 2008; Physical and Health Education Canada, 2008; Sport and Recreation New Zealand, 2007, 2009; Australian Council for Health Physical Education and Recreation, 2009).

Secondary school PE, sport education and physical activity in an international context

Of the countries investigated within this study, Australia, Canada, England, New Zealand and the United States (USA), all have one or multiple physical activity, PE or sport education policies at a national, state or territory level which are required to be implemented in schools (Table 1). Within Australia there is currently no nationwide policy related to PE, with individual states and territories having their own requirements. However, the Active Schools Curriculum Policy which is nationally disseminated encourages all schools to deliver 120 minutes per week of physical activity (Commonwealth Government of Australia, 2004). Similarly, New Zealand's guidelines focus on physical activity and suggest 60 minutes per day based on the guidelines for sustainable physical activity in school communities (Ministry of Education, 2007). In contrast to these national physical activity policies for schools, Canada, England and the USA have specific nationwide PE policies. England requires 120 minutes per week of PE and sport education (Dept for Education and Skills and

Table 1 International comparison of physical education, sport education and physical activity policies

Country	Mins p/wk of PE/PA/Sp	What is to be provided in or outside curriculum	State/Territory	Mins p/wk of PE/PA/Sp	What is to be provided in or outside curriculum	PE provision across year levels	Age (Years)
Australia	120 (#)	a	Australian Capital Territory [1]	100–50	c	K–10	4–15
			New South Wales [2]	120	c	K–10	4–15
			Northern Territory [3]	120	c	Pr–10	4–15
			Queensland [4]	120–50	b	Pr–10	4–15
			South Australia [5]	120	a	Pr–10	4–15
			Tasmania [6]	120	a	K–8	4–13
			Victoria [7]	100–200	c	Pr–10	4–15
			Western Australia [8]	120	b	Pr–10	4–15
Canada	150 (*)	b	Alberta [9]	150	c	E1–10	4–15
			British Columbia [9]	65–150	b	K–7	4–12
			Manitoba [9]	125	b	K–10	5–15
			New Brunswick [9]	100–50	c	K–9	4–14
			Newfoundland/Labrador [9]	90	c	K–9	4–15
			Nova Scotia [9]	100–50	c	K–9	4–15
			Ontario [9]	165	b	K–10	4–15
			Prince Ed Island [9]	60–108	c	1–9	4–15
			Quebec [9]	120	c	K–6	4–14
			Saskatchewan [9]	150	c	1–9	5–14
England	120 (#) [10]	c	N/A	N/A	c	R–10	4–14
New Zealand	300 (#) [11]	b	N/A	N/A	b	Y1–11	4–15

continued

Table 1 continued

Country	Mins p/wk of PE/PA/Sp	What is to be provided in or outside curriculum	State/Territory	Mins p/wk of PE/PA/Sp	What is to be provided in or outside curriculum	PE provision across year levels	Age (Years)
USA	E 150 (*) HS 225 (*)	c	Louisiana [12]	150	c	K–8	4–13
			New Jersey [12]	150	c	E1–12	5–17
			Montana [12]	225	c	K–8	4–13
			Indiana [12]	225	c	Not specified	N/A
			Montana [12]	225	c	K–8	4–13
			South Carolina [12]	225	c	E1–8	5–13
			District of Columbia [12]	225	c	K–10	4–15
			California[13]	E 100 HS 200	c	K–12	4–17
			Alabama, Alberta, Arkansas, Delaware, Louisiana, Maine, Maryland, Minnesota, Missouri, New Hampshire, New Mexico (K-9), North Carolina, Ohio, Tennessee, Utah, Vermont (K-9), Virginia (K-7), Washington, West Virginia, Wisconsin[12]	Not specified	c	K–8 HS not specified	4–13
			Illinois, Massachusetts, New Jersey, New York, Rhode Island, [12]	Not specified	c	K/1–12 only	4–17
			Arizona, Idaho, Mississippi, Nebraska[12]	Not specified	c	K–8 only No HS required	4–13

continued

Table 1 continued

Country	Mins p/wk of PE/PA/Sp	What is to be provided in or outside curriculum	State/Territory	Mins p/wk of PE/PA/Sp	What is to be provided in or outside curriculum	PE provision across year levels	Age (Years)
			Georgia, Hawaii, Kansas, Oklahoma, Pennsylvania[12]	Not specified	c	K–5/6 HS not specified	4–10/11
			Alaska, Florida, Indiana, Iowa, Kentucky, Nevada, Oregon, South Dakota, Texas[12]	Not specified	c	HS only	11–17
			Colorado, Connecticut, Michigan, North Dakota, Wyoming[12]	None	N/A	N/A	N/A

Note:(#) = policy directed by government; (*) = policy provided by national PE professional organization; a = provide physical activity only within or outside the curriculum; b = provide physical activity and PE within and outside the curriculum; c = provide PE and/or sport education only within the curriculum; E = elementary, which is equivalent to primary levels; K, Pr, R = first year at school in some states of Australia, Canada, England and the USA; N/A = not applicable; P/A = physical activity; p/wk = per week; Sp = sport education; Y = year level that students are participating in PE; HS = high school: refers to the upper levels of schooling, including junior, middle and senior high school in the USA and some states of Australia (secondary level of education in Australia is equivalent to HS).

[1] Australian Capital Territory Dept of Education and Training, 2007; [2] New South Wales Dept of Education and Training, 2006; [3] Northern Territory Government, 2008; [4] Queensland Dept of Education, 2007b; [5] South Australian Dept of Education and Children's Services, 2006; [6] Tasmanian Dept of Education, 2009; [7] Victorian Dept of Education and Early Childhood Development, 2007; [8] Western Australian Dept of Education and Training, 2007; [9] Canadian Association for Health, Physical Education, Recreation and Dance, 2006; [10] Dept for Education and Skills and Dept of Culture, Media and Sport, 2004; [11] Ministry of Education, 2007; [12] National Association for Sport and Physical Education, 2006; [13] San Diego State University, 2007.

Dept of Culture Media and Sport, 2004). In Canada, the Quality Daily Physical Education program (QDPE) requires daily curricular instruction of 30 minutes per day across all year levels (Canadian Association for Health, PE, Recreation and Dance, 2006). Similarly, at elementary level in the USA, 150 minutes per week of PE is recommended, increasing to 225 minutes per week of PE for middle and high school students (Table 1) (National Association for Sport and Physical Education, 2008). Terminology defining year levels of schooling across the world is variable and Table 1 provides further clarification of comparative terms used.

Mandated secondary school PE, sport education and physical activity

In each of the countries compared (Table 1), PE policy is more often than not delegated to state departments, local authorities or to individual schools, with some incorporating and taking into account government or professional association national directives and some adopting their own policy. There are contrasting time periods given to specific PE policies, ranging from 60–165 minutes per week across Canada to 100–200 minutes per week in Australia (Australian Capital Territory Dept of Education and Training, 2007; New South Wales Dept of Education and Training, 2006; Northern Territory Government, 2008; Queensland Dept of Education, 2007b; Canadian Association for Health, PE, Recreation and Dance, 2006; Western Australian Dept of Education and Training, 2007). In New Zealand, although schools are required to provide PE, there is no specific PE time provision in their policy. However, the accrued daily recommendation would result in a potential total of 300 minutes per week of PE and physical activity (Ministry of Education, 2007). England allows schools and headteachers to make individual school decisions, with the expectation that they provide 120 minutes per week of physical and sport education for students (Dept for Education and Skills and Dept of Culture Media and Sport, 2004). In some states in the USA there is no requirement for the provision of PE. In contrast, from 200 to 225 minutes per week may be offered in schools in the states of California, Indiana, Montana, South Carolina and the District of Columbia across various school year levels (National Association for Sport and Physical Education, 2006; San Diego State University, 2007). In most instances, students in all of the forementioned countries are usually provided with PE from the commencement of their schooling until the end of compulsory education (Table 1). Just as there is diversity in the amount of time allocated to PE, countries have various combinations of PE, sport education and physical activity that may be provided in schools both in and outside curriculum time (Table 1).

Are schools meeting mandates?

Internationally, it becomes increasingly difficult for some schools to follow policy and make valuable contributions to knowledge and physical activity when many countries

do not even offer PE within the curriculum. Hardman (2008) reported that 21 percent of countries surveyed indicated that PE was not being implemented in accordance with statutory obligations or expectations, or quite simply not at all. Furthermore, it can also be observed that, within those countries that were required to provide PE, there were vast differences between official policy and the actual delivery of PE (Hardman, 2008). This trend is also apparent in Australia, where despite such policies at national and local levels, studies indicate that students in Australia are not meeting PE mandates. Over two-thirds of secondary schools (67 percent) were not able to satisfy the South Australian mandate of 100 minutes per week (Brown et al., 1999). Similarly, a Queensland review found that just under half of secondary students (41 percent) were not accessing adequate amounts of physical or sport education each week in schools (Queensland Dept of Education, 2007a). After the implementation of the Daily Physical Education Program in the late 1970s and 1980s in some states of Australia, it was found that no schools or teachers, no matter how enthusiastic or competent, had been able to fulfil the recommended time requirements of the program (Kirk et al., 1989). Furthermore, Turnbull (1992) suggests that generous estimates conclude that less than 10 percent of Australian government school children undertook daily PE as part of the Daily Physical Education Program. Likewise, in the USA, where 78.3 percent of schools require some PE, only 3.8 percent of elementary, 7.9 percent of middle school and 2.1 percent of high schools provide daily PE for the entire year (Lee et al., 2007). The USA Shape of the Nation Report (National Association for Sport and Physical Education and American Heart Association, 2006) reported that, at middle school level, only one of the seven states that mandate PE achieved the 225 minutes per week. Similarly only four of the 11 states that mandate PE at high school also reached the target (National Association for Sport and Physical Education and American Heart Association, 2006). In 2005, the Canadian Fitness and Lifestyle Research Institute found only 22 percent of Canadian children actually received daily PE and 9 percent received no PE at all (Canadian Fitness and Lifestyle Research Institute, 2005). A total of 29 percent of schools reportedly had no policy regarding PE or physical activity in Canada (Canadian Fitness and Lifestyle Research Institute, 2006). In direct contrast to these countries, the recent 2007/8 survey of the National Physical Education, School Sport and Club links (PESSCL) strategy programme in England showed that 78 percent of secondary schools were providing 120 minutes or more of PE within curriculum time (Quick et al., 2008). Schools participating in this programme receive direct funding if they achieve time and provision targets. Future targets are designed to encourage the provision of a total of three or more hours of PE, sport education and physical activity both within and outside curriculum time (Quick et al., 2008).

Regardless of numerous PE, sport education and physical activity policies internationally, this comparison highlights great variations between policy and implementation. This variance further emphasizes the challenges teachers and schools face in delivering PE to students of all ages and highlights the possible decreases in the opportunities available to children and adolescents in school settings across the world.

Secondary school PE, sport education and physical activity in Victoria, Australia

In 2004, Australia introduced the National Physical Activity Guidelines to encourage increased activity in children and adolescents. Although these guidelines are not required to be implemented in or by schools, they are similar to many countries in that they suggest children and adolescents aged between 5 and 18 years of age access several hours a day of physical activity, with at least 60 minutes a day of moderate to vigorous physical activity for health (Commonwealth Department of Health and Ageing, 2004). In contrast, unlike the National Physical Activity Guidelines, the Active Schools Curriculum Policy, which is also disseminated from a national level, purposely targets schools and encourages them to provide 120 minutes per week of physical activity (Commonwealth Government of Australia, 2004). All Australian states and territories are responsible for their own education system and structure and therefore the provision of physical activity, sport education and PE policy. Specifically in the state of Victoria, the Department of Education and Early Childhood Development (DEECD) is responsible for the physical education and sport education policy (Victorian Dept of Education and Early Childhood Development, 2007). This policy mandates the requirement of 100 minutes per week of PE and 100 minutes per week of sport education across compulsory levels of secondary school (Year 7–10) (Table 1). There are no published data in Victoria on whether schools are meeting this mandate or not. Therefore, the purpose of this study was to investigate specialist PE teachers' awareness and knowledge of the policy and implementation of the mandate within their Victorian state secondary school.

Methodology

Recruitment

A total of 271 schools were approached to take part in this study, with the questionnaire being made available to all PE heads of department and specialist PE teachers in 248 Victorian state secondary schools (Year 7–12) and 23 preparatory to Year 12 state schools (Prep–Year 12). Schools that did not provide a PE program; a program across the mandated levels of PE (Year 7–10); report on VELS (Victorian Curriculum and Assessment Authority, 2008) levels as required by the Department of Education, Early Childhood and Training or could not provide a PE program that did not require combining classes across multiple year levels were excluded from the study. A total of 24 state schools were excluded from the study.

Prior to data collection, the Victorian Department of Education and Early Childhood Development required that all eight Regional Education Directors in Victoria were informed of the study and requirements of the schools participating within those regions. This was completed via fax or email. The database of schools contact information was established by viewing regional databases or individual school websites.

Principals of each school were then informed via email of the online questionnaire and were asked to forward relevant details to the PE heads of department. PE heads of department across the state were also individually emailed and they were asked to make their PE staff aware and encourage completion of the questionnaire. After the initial four-week recruitment period, further reminders were emailed to PE heads of department and PE teachers. Schools that had not responded to the questionnaire after four weeks were also mailed a letter in an attempt to enlist their participation. The collection period was for eight weeks in total.

Questionnaire

The online questionnaire was conducted between October and December 2008. Ethics approval was obtained from RMIT University and the Victorian Department of Education and Early Childhood Development (DEECD), after which piloting of both printed and online questionnaires took place. After the questionnaire went live, a trial period of one week enabled any difficulties associated with the format and completion of the online questionnaire to be assessed before the questionnaire was made available to schools. Minor adjustments were made to the layout and structure of the web pages, with no changes made to the content.

Respondents were asked to comment on the provision of PE within their school and demonstrate their understanding of state and national PE, sport education and physical activity policies and indicate how these were implemented in their school. As the questionnaire took approximately 20–30 minutes to complete, the format was designed for ease of completion. Questions included yes or no options, selection from lists of alternatives, numerical ranking of options and free text questions. When accessing the web page, respondents were introduced to the purpose of the study, approximate time required to complete, given access to the Plain English Statement and told that the respondent could remain anonymous should they choose to do so.

The questionnaire was divided into two: questionnaire A which was completed by PE teachers (sections A–E) and questionnaire B completed by PE heads of department (sections A–F). Only sections A, B and F of the questionnaire were used in this study and attempted to gain information relevant to: a) demographic information of the teacher and school; b) knowledge of PE and physical activity policies in Australia and the state of Victoria and the provision of physical and sport education within their schools; f) Heads of PE questions relevant to their responsibilities, curriculum content and school-specific PE issues. Upon completing each section, respondents were asked to include the last four digits of their six digit Victorian Institute of Teaching (VIT) registration number as a checking measure to ensure that all data submitted by respondents was gathered in one data file. Participants could include their school or personal email address if they chose to do so, however, not including this information did not exclude them from completing the questionnaire.

Data analysis

Analysis consisted of simple frequency statistics for all demographic variables including means, standard deviations and percentages. Cross tabs with Pearson's chi square analysis were used to investigate the associations between teacher knowledge of a range of policies and the age, years of teaching experience and the position of responsibility held by respondents. The association between different types of schools in terms of size and location (rural, remote or metropolitan) and their ability to meet the Victorian Physical Education and Sport Education mandate were also investigated using cross tabs with Pearson's chi square. A p-value of <0.05 was accepted as statistically significant. To investigate the strength of these relationships, the standard residual was calculated with ± 1.96 defined as statistically significant. There were no missing data from section A of the questionnaire (n = 115). Missing data were excluded from the analysis in section B, with 11 respondents not completing this section of the survey (n = 104). Section F was completed by PE heads of department only: of the total 48 PE heads of department six respondents did not complete section F (n = 42). All data were analysed using Statistical Package for Social Sciences (SPSS for Windows, Version 17, SPSS Inc., Chicago, IL, USA).

Results

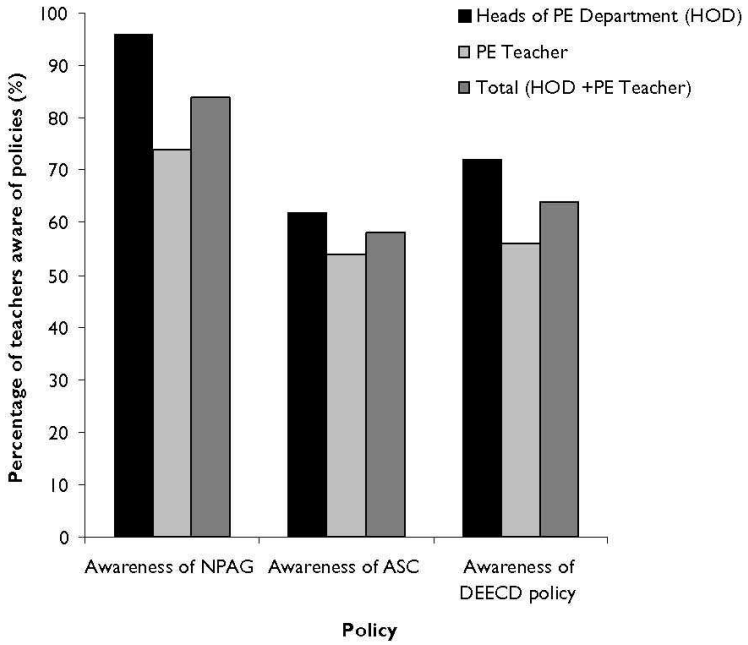
A total of 115 state secondary specialist PE teachers responded to the online questionnaire (male = 62, female = 53). Of these, 48 respondents were PE heads of department and the remaining 67 respondents were PE teachers. The mean age range of teachers was between 31 and 35 years. A total of 32 percent of all teachers surveyed had 18 years or more teaching experience, 27 percent between less than six months and four years experience, 22 percent between five and eight years of experience, with small numbers of teachers having between 9–12 years (9.5 percent) and 13–17 years (9.5 percent) of teaching experience. Of the teachers surveyed, 78 percent held leadership positions within the school as either PE heads of department or in other leadership roles. Respondents taught in schools that were defined by the Victorian Department of Education and Early Childhood Development as metropolitan (n = 81), rural (n = 29) or remote (n = 5). There were 15 teachers who taught in schools with less than 200 students; in contrast a total of 48 teachers taught in schools that had student populations over 1001 students. Of the respondents, 111 teachers taught in coeducational schools and four in female-only schools. Of the 271 schools that were approached, responses were obtained from 54 different schools, with the addition of 35 respondents who did not report which school they were from. There were multiple responses from some schools.

Specific questions were asked of the 48 PE heads of department pertaining to their role. A total of 29 percent had only been in their current PE head of department position for between 6–12 months. In comparison, 26 percent of respondents had held the position of PE head of department over their entire career for 11 or more years. Twenty-six of the PE heads of department taught in metropolitan schools, 18 in rural

schools and four in remote schools in Victoria. A third of heads of PE taught in schools with over 1001 students, compared with 23 percent of PE heads of department who taught in schools with less than 200 students.

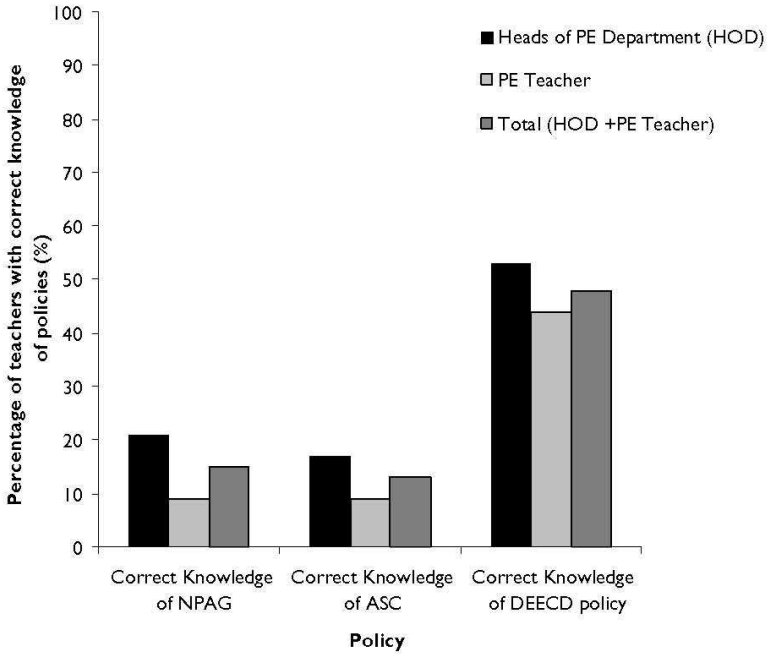
Awareness and knowledge of policy and mandates

All PE teachers were asked of their awareness and knowledge of the Australian National Physical Activity Guidelines, the Australian Active Schools Curriculum Policy, and the Victorian Physical Education (100 minutes per week) and Sport Education (100 minutes per week) Policy which is mandated across state secondary schools in Victoria (hereafter, referred to as the Victorian mandate). There was a greater awareness of the National Physical Activity Guidelines (84 percent) compared to the Active Schools Curriculum Policy (58 percent) and Victorian mandate (64 percent) (Figure 1a), although the actual specifics of the policy were not as well known, with only 15 percent of respondents able to state the correct National Physical Activity Guidelines for adolescents (Figure 1b). In comparison, just under half of



NPAG = National Physical Activity Guidelines;
ASC = Active Schools Curriculum Policy;
DEECD Policy = Victorian mandate.

Figure 1a Victorian state secondary school specialist PE teachers' awareness of PE, sport education and physical activity policies



NPAG = National Physical Activity Guidelines;
ASC = Active Schools Curriculum Policy;
DEECD Policy = Victorian mandate.

Figure 1b Victorian state secondary school specialist (PE) teachers' correct knowledge of PE, sport education and physical activity policies

respondents (48 percent) demonstrated correct knowledge of the Victorian mandate (Figure 1b). There were no significant associations between the position held by the teacher, either as PE head of department or PE teacher, and their correct knowledge of the Victorian mandate ($\chi^2(1) = 0.899$, $p = .343$) or the Active Schools Curriculum Policy ($\chi^2(1) = 1.603$, $p = .206$). However, there was a trend ($\chi^2(1) = 3.263$, $p = .071$) toward an association between correct knowledge of the National Physical Activity Guidelines and the position held by the teacher. Further analysis revealed that PE heads of department had greater knowledge of these guidelines ($z = 1.2$) than PE teachers (Figure 1b). Furthermore, the years of teaching experience had limited influence on the knowledge of each of the policies, with no relationship evident between the years of teaching experience and knowledge of the Active Schools Curriculum Policy ($\chi^2(2) = 4.635$, $p = .099$) or knowledge of the National Physical Activity Guidelines ($\chi^2(2) = 2.715$, $p = .257$). In contrast, teaching experience was weakly associated with a greater correct knowledge of the Victorian mandate ($\chi^2(2) = 5.515$, $p = .063$), with teachers who had 18 years or more of teaching experience having a greater knowledge of the mandate ($z = 1.4$).

Of the PE heads of department, 29 percent gained their knowledge of the Victorian mandate from the professional association, the Australian Council for Health, Physical Education and Recreation (ACHPER), while nearly a quarter of PE teachers gained their knowledge of the mandate from their teacher training (22 percent). Similarly, it was teacher training that provided PE heads of department (24 percent) and PE teachers (48 percent) with most knowledge of the Active Schools Curriculum Policy. Greatest knowledge of the National Physical Activity Guidelines was obtained by PE heads of department (31 percent) and PE teachers (21 percent) by accessing the actual guidelines directly.

Provision of PE and sport education within Victorian state secondary schools

Within their schools, 56 percent of PE heads of department reported that PE and sport education were provided as separate subjects, with 13 percent of respondents' schools offering a combined physical and sport education curriculum over various year levels (Figure 2). There is an obvious decline in the provision of PE and sport education as separate subjects as the year level increases over the compulsory years of education. Conversely, there is an increase in PE as a single subject being offered, indicating a loss of sport education in preference to PE, with increases in PE apparent

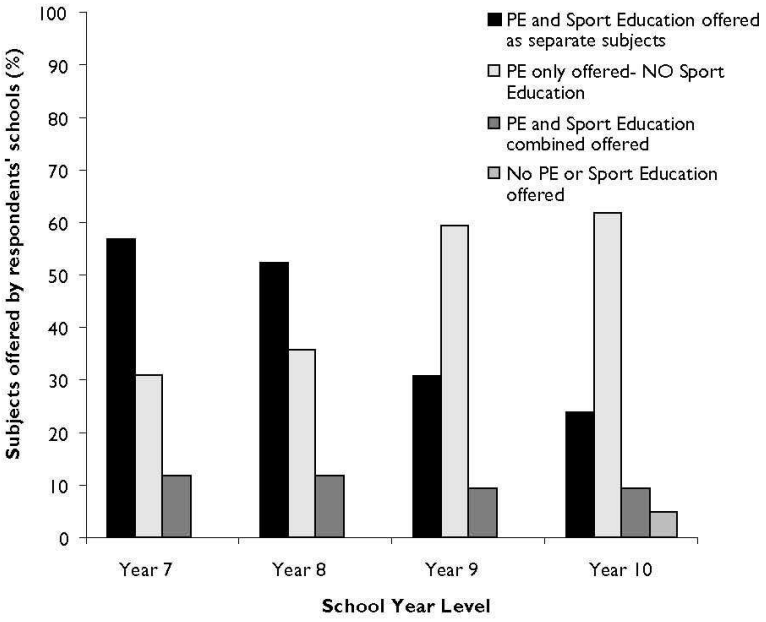


Figure 2 Comparison of Victorian state secondary school PE heads of department reported provision of PE and sport education in their school

from Year 7 (31 percent) to Year 10 (62 percent) (Figure 2). There were 45 PE heads of department out of the 48 in total who taught in coeducational schools, with under half offering single-sex classes at Year 7 (13 percent), Year 8 (21 percent), Year 9 (38 percent), and Year 10 (28 percent) in their school.

Implementation of the Victorian mandate in state secondary schools

In schools that provided PE as a separate subject, a greater number of respondents reported their school did not meet the 100 minute per week PE mandate compared with those who reported their school provided 100 minutes or more of PE per week (Figure 3a). This is similar to schools which provided combined PE and sport education, with only three respondents stating that they met the 200 minute mandate (when combined) across various year levels. It is also evident that at Year 9 and Year 10 some schools may not offer PE to students at all. Similar trends are apparent across year levels in relation to the provision of the 100 minutes per week sport education when it is offered as a separate subject (Figure 3b). The most noticeable difference

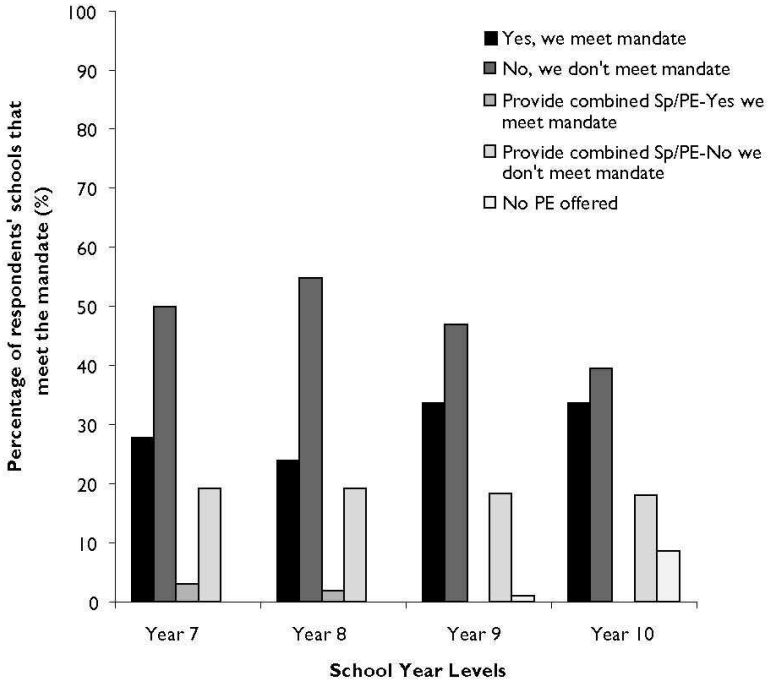


Figure 3a Provision of PE that meets the Victorian PE 100 minute per week mandate across school year levels

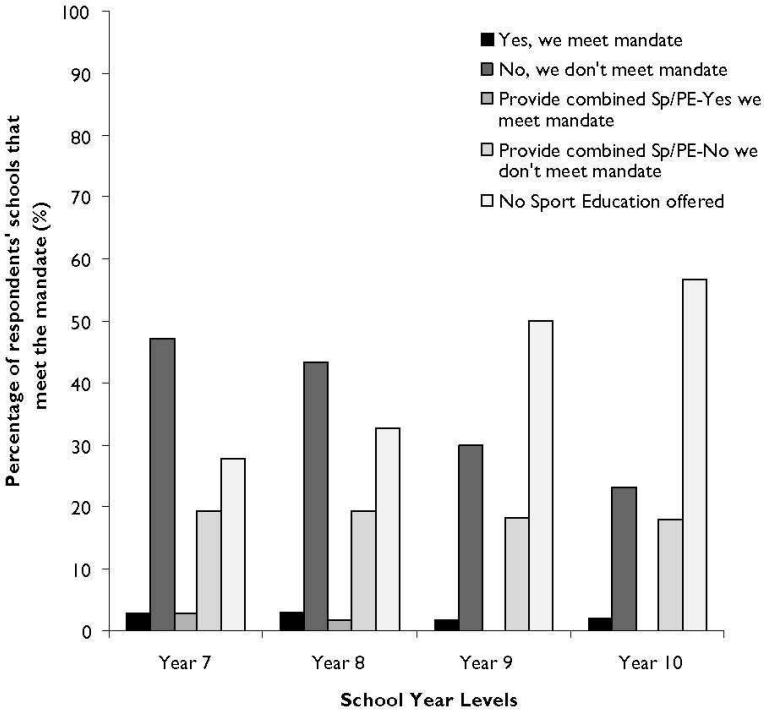


Figure 3b Provision of sport education (Sp) that meets the Victorian sport education 100 minutes per week mandate across school year levels

between the provision of PE and sport education is the reduction in the amount of sport education offered as year levels increase from Year 7 to Year 10.

There was no association between the location of the school (metropolitan or rural/remote) and the ability of that school to specifically meet the Victorian 100 minutes per week PE mandate across Year 7 ($\chi^2(1) = 1.319, p = .251$), Year 8 ($\chi^2(1) = 2.307, p = .129$) or Year 10 ($\chi^2(1) = 2.971, p = .085$). There was however, a significant association ($\chi^2(1) = 5.658, p = .017$) between the location of the school and the ability of the school to meet the PE mandate at Year 9 level. Subsequent analysis revealed that rural and remote schools were less likely ($z = -1.5$) to meet the PE mandate at Year 9. There is also a significant association between the size of the school (having ≤ 800 students or ≥ 801 students) and the ability of that school to meet the PE mandate at Year 7 level ($\chi^2(1) = 4.464, p = .035$), Year 8 ($\chi^2(1) = 4.976, p = .026$), and Year 9 ($\chi^2(1) = 4.246, p = 0.039$). Additional analysis revealed that smaller schools (≤ 800 students) found it more difficult to meet the PE mandate at Year 7 ($z = -1.3$), Year 8 ($z = -1.5$) and Year 9 ($z = -1.2$). There was no association between school size and meeting the PE mandate at Year 10 level ($\chi^2(1) = 1.382, p = .240$).

A total of 32 percent of PE heads of department reported they had no recognized procedure in place to measure the schools' compliance with the Victorian mandate. Furthermore, 14 percent stated they did not measure their compliance at all. Other PE heads of department stated that they measured compliance by: referring to the timetable (21 percent), the principal decides (24 percent), they completed appropriate forms (7 percent) and 2 percent were unsure of how the school measured its ability to meet the mandate.

Discussion

PE, sport education and physical activity policies for schools are often underpinned by common objectives: to get children and adolescents active and to provide an education to develop fundamental skills to enable lifelong health and activity choices to be made. However, as reported by Hardman (2008), the discrepancies between actual implementation and written PE policy suggest many inconsistencies. The comparative results reported here in Table 1 draw attention to the worldwide differences in the provision of PE; the time variations with offerings as little as 65 minutes per week to 300 minutes per week and vastly different policy and curriculum content with PE, physical activity and sport education being provided in various combinations. However, the importance of these findings lies not in the fact that there are large differences in policy across the world as governments and even schools themselves grapple with increasing pressure to activate communities, but with the knowledge that there appears to be limited accountability for the many policies; the majority are accountable only by means of self-reported data. The 'failure to strictly apply legislation on school PE provision' (Hardman, 2008: 23) is not only apparent across the world, but also in Victoria, Australia, where 46 percent of PE heads of department from this study reported that they had no procedure in place or did not measure their compliance to the Victorian mandate. This demonstrates a disparity between mandated policy and its implementation, and highlights that, although policy and mandates can be put forward in Victorian secondary schools, compliance appears to be influenced by many external factors, including lack of accountability. Similarly, the recent Crawford Report (Commonwealth of Australia, 2009: 27) highlights that 'no measurement of delivery' is apparent across all of Australia and that decisions regarding PE and physical activity are largely left to schools and teachers.

Awareness and knowledge of policy and mandates

Both the 1992 Senate Inquiry (Commonwealth of Australia, 1992) and the Victorian-based Moneghetti Report (Directorate of School Education, 1993) highlight the crowded curriculum in schools as one component that was stifling the progress of and participation in PE. Recommendations from the Moneghetti Report led to the development of the Victorian Physical Education and Sport Education Policy. The awareness and knowledge of such policy can give teachers and heads of department

power to ensure decisions regarding curriculum and teaching and learning spaces are equitable. Despite the importance of acquiring this information, only 48 percent of teachers surveyed demonstrated the correct knowledge of the Victorian mandate, with 72 percent of PE heads of department and 56 percent of PE teachers reporting that they were at least aware of the mandate. There was a weak association between years of teaching experience and the correct knowledge of the mandate. The Victorian mandate was first developed in 1993 and was heavily promoted and required to be implemented in state schools by the end of 1995, therefore those with greater years of teaching experience may be more familiar with the policy. Interestingly, there was a greater awareness of the National Physical Activity Guidelines across all respondents (84 percent) than the Victorian mandate (64 percent). In an attempt to increase activity and decrease associated health risks, upon release the Federal Government campaigned strongly with persistent advertising and encouraged the inclusion of these guidelines in many state curricula and classrooms. This may have been responsible for the greater awareness of the National Physical Activity Guidelines reported in this study and confirms the notion put forward by Bellew et al. (2008) that stronger political support may just be one of the solutions to increasing participation and awareness of activity policies within our communities. Results from this study further encourage proactive professional development from professional associations as nearly a quarter of PE heads of department gained their knowledge of the Victorian mandate from ACHPER. The role of teacher training in universities can also be considered influential in disseminating knowledge of the Active Schools Curriculum Policy and the National Physical Activity Guidelines and should be responsible for keeping students abreast of developments as Australia enters a new phase of developing a National Curriculum.

Implementation of PE and sport education policy in Victorian state secondary schools

In total, only a third of respondents reported that their school provided at least 100 minutes per week of PE at Years 9 and 10. More concerning are the results at Year 7 (28 percent) and Year 8 (23 percent), an age where lifelong activity patterns are established, where it was evident that fewer respondents' schools were providing 100 minutes per week of PE. Data from this study demonstrates that there are a greater number of schools not meeting the PE mandate than are compliant. Similarly, this is reflected in schools' ability to meet the sport education mandate, with only 3 percent of respondents' schools at Year 7 and 8, and 2 percent at Year 9 and 10 reporting meeting the sport education mandate. Schools that combined PE and sport education also reported similar results. Ultimately, it demonstrates that schools are having difficulty providing opportunities for the combined total of 200 minutes of PE and sport education. Further research is warranted to understand the barriers impeding the provision of physical and sport education that meets the Victorian mandate as it is paramount to the future of quality PE in Victorian secondary schools. This pattern of

non-compliance has not changed from and is consistent with trends observed in other parts of Australia by Brown et al. (1999), Booth et al. (2006) and the Queensland Department of Education (2007a). Whether it be PE non-compliance (66–77 percent across year levels; Figure 3a) or sport education non-compliance (97–8 percent across year levels; Figure 3b), a large number of Victorian secondary schools are not meeting the mandate, therefore opportunities to be active for the recommended duration of time are not being made available to students.

There is some evidence in Australia to suggest that policies mandating compulsory school PE and sport may not be sufficient to increase physical activity and fitness (Cleland et al., 2008). In this study, this is reinforced by the fact that policy, although written and mandated, is not being implemented by a large number of schools. Therefore potentially students are not provided with opportunities to increase activity and possibly achieve the many goals of PE which Fairclough et al. (2002) states are dependent on personal preferences and rationales. However, by simply offering PE opportunities it may not engage, excite or encourage participation and may in fact alienate students (Carlson, 1995). In summary, providing opportunities for PE, sport education and physical activity does not necessarily equate to schools and students meeting mandated requirements.

The significant relationship between the size of the school and the ability of that school to meet the PE mandate at Year 7, 8 and 9 may be explained by smaller schools having less funding and therefore potentially access to fewer facilities, equipment or staff and therefore less flexibility which could result in school-based decisions on curriculum that decrease time provisions for PE. Anecdotal evidence also suggests that schools are often endeavouring at Year 9 level to provide a large range of elective based options to stimulate students and this can sometimes be to the detriment of compulsory physical or sport education. Although frequently there are options related to PE made available, such as outdoor education and human movement, these were not considered in this study as they often involve different curriculum content and objectives. The significant association between rural and remote schools at Year 9 level being less likely to meet the PE mandate could possibly be attributed to many rural and remote schools offering trade and training based programmes for students at Year 9 and Year 10, however, this would need further investigation to fully elucidate. The offering of these subjects is suited to their student populations and also attempts to bolster potential employment opportunities within the community.

The difference between a school's ability to meet PE in preference to the sport education mandate is of considerable interest. Research suggests that a strong foundation in fundamental movement skills will result in participants being more active, both during childhood and adulthood (Bailey, 2006). To assist this strong foundation and development, the Victorian Physical Education and Sport Policy highlights that students should have access to both physical and sport education until the end of compulsory schooling. In direct contrast to these objectives, the results from this study indicate a steady decline in the provision of PE and sport education (as separate subjects) as students' increase in age and year level (Figure 2). At Year 7 level, 49 percent of respondents' schools offered separate PE and sport education, in

comparison to Year 10 where only 23 percent of respondents' schools did so. Conversely, there is an increase in PE as a single subject being offered as the year level increases, with no sport education being provided which therefore makes meeting the sport education mandate unattainable. As schools make decisions regarding curriculum content, the debate then turns to which is most important to the student? Schools will wrestle with providing sport education which encourages the development of competent, literate and enthusiastic sportspersons (Siedentop, 1994), or PE which potentially provides the opportunity for students to obtain the knowledge and skills needed to establish and maintain physically active lifestyles (Lee et al., 2007). The data from this study indicate that schools in Victoria when asked to decide between the two subjects are providing PE in preference to sport education, particularly in the later years of compulsory schooling.

There is limited published trend data available in Australia on children's participation in physical activity, school PE and sport (Salmon et al., 2005), with the majority of research in this area completed in primary schools. There were 271 schools available to access for this study, and data were received from 54 known schools, with the addition of 35 respondents who did not report which school they were from. Schools from metropolitan, rural and remote areas are well represented, as well as varied school sizes: schools with less than 200 students to schools with over 1001 students. The range of experience that teachers have is vast, with beginning teachers, moderate levels of experience and those with over 18 years of experience all completing the questionnaire. The assumption that all schools had access to the internet was made by researchers and that each school's email mailbox was cleared daily and directed to those appropriate within the title of the email. This chain of communication may have been hampered by technology or failure of someone to pass on information. A potential limitation of the current study is that self-reported data were obtained and therefore teachers may not have accurately represented the physical and sport education programmes delivered within their school. However, although mandates are in place, there are no procedures that independently assess compliance, necessitating the reliance on self-reported data.

Conclusion

This study in Victoria, Australia, further supports Hardman (2008) who reported that the majority of PE and school-based physical activity policies in place around the world are unable to be achieved, monitored or held accountable. Specifically, this study gives a unique insight into what is actually occurring in Victorian state secondary schools. The reported compliance of respondents' schools to the PE and sport education mandate is low across compulsory levels of schooling, in both PE (between 23 and 33 percent) and sport education (between 2 and 3 percent). The reduction of sport education in preference to providing PE is of great interest, emphasizing the challenge of disseminating policy and consequently the impact of this on its implementation in schools. It also highlights the concerning trend of reducing PE and activity opportunities in schools and raises the decades-old question

of whether students, if given the opportunities, can actually be engaged, encouraged and excited by PE. Further research is warranted to understand the barriers specific to the provision and participation in physical and sport education in Victorian state secondary schools. This information may provide opportunities to stimulate the school environment and PE curriculum to offer more opportunities for quality physical and sport education and physical activity pursuits in and outside curriculum time.

Acknowledgements

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deren faktischer Umsetzung im Rahmen des Pflichtunterrichts an Sekundarschulen in Victoria State. Ein Online-Fragebogen wurde von 115 Lehreinnen und Lehrern beantwortet, 48% von ihnen kannten den entsprechenden Auftrag. Die Lehrerinnen und Lehrer berichteten von einer Umsetzungsrate von 23–33% in Bezug auf den Sportunterricht und von 2–3% in Bezug auf Sporterziehung. Es konnten signifikante Zusammenhänge zwischen Schulgröße und berichteter Umsetzung der Strategien in der 7. Klasse ($\chi^2(1) = 4.46$, $p = 0.035$), in der 8. Klasse ($\chi^2(1) = 4.97$, $p = 0.026$) und in der 9. Klasse ($\chi^2(1) = 4.24$, $p = 0.039$) aufgezeigt werden. Zusammenfassend machen die Ergebnisse deutlich, dass das Bewusstsein bzw. Wissen von Lehrerinnen und Lehren nicht automatisch mit der Realisierung der entsprechenden Strategien einhergeht.

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APPENDIX B: PEER-REVIEWED SCIENTIFIC CONFERENCE ORAL PRESENTATIONS

1. Jenkinson, K. A., Naughton. G. & Benson, A. C. The GLAMA (Girls! Lead! Achieve! Mentor! Activate!) and BLAST (Boys! Lead! Activate Succeed Together!) peer leadership and physical activity program: A stealth intervention. *International Congress on Physical Activity and Public Health: Be Active Conference*. Sydney Convention and Exhibition Centre, Sydney, Australia, 31st October- 3rd November, 2012. Journal of Science and Medicine in Sport, 15 (6) S130.

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The GLAMA (Girls! Lead! Achieve! Mentor! Activate!) and BLAST (Boys! Lead! Activate! Succeed Together!) peer leadership and physical activity program: A stealth intervention

K. Jenkinson[1]* ▪ G. Naughton[2] ▪ A. Benson[1] ▪ [1]RMIT University ▪ [2]Australian Catholic University

Introduction: Within school settings, the effectiveness of stealth interventions that promote one outcome whilst designed to illicit additional outcomes warrants further investigation. Disguising the primary aim of promoting physical activity may be a successful avenue for sustainable school-based interventions. This study aimed to evaluate the efficacy of the GLAMA (Girls! Lead! Achieve! Mentor! Activate!) and BLAST (Boys! Lead! Activate! Succeed Together!) peer leadership and physical activity program: a primary to secondary school transition program aimed to increase leadership opportunities and physical activity.
Methods: Forty three Year 10 (Y10) peer leaders and 160 Year 7 (Y7) students from two state secondary schools (control and intervention) in Victoria, Australia participated. The primary outcomes were change in Y10 leadership self-efficacy and Y7 school connectedness. The group-by-time interactions of the primary and secondary outcomes were investigated with repeated measures analysis. In addition, regression analyses were performed to assess the relationships between Y7 school connectedness and social self-efficacy, social connectedness, physical activity self-efficacy (PASE) and bullying. The relationship between general self-efficacy, PASE, physical and psychosocial health to leadership self-efficacy in Y10 students were also measured

Results: There were significant decreases in Y7 school connectedness for both the intervention ($p=0.002$) and control ($p=0.015$) schools, but were not significant between schools ($p=0.735$). Change (post-pre) in social self-efficacy, social connectedness, PASE and bullying experiences ($r=0.551$, $p<0.001$) contributed 29.2% to the variance in Y7 change in school connectedness. In the intervention school, 43.2% of variance in change in school connectedness was attributable to change in social self-efficacy, social connectedness, PASE and bullying ($r=0.670$, $p<0.001$). Additionally, Y7 PASE increased significantly in the intervention school ($p=0.027$), but not the control school ($p=0.110$); or between schools ($p=0.335$) following the GLAMA and BLAST program. Leadership self-efficacy in Y10 leaders did not significantly change following the intervention, however, there were significant group-by-time interactions ($p=0.016$) for PASE. Baseline general self-efficacy ($r=0.221$, $p=0.025$) and change in general self-efficacy ($r=0.361$, $p=0.001$) were the only predictors of change in Y10 leadership self-efficacy.
Discussion: The GLAMA and BLAST program provides an insight into school connectedness and leadership self-efficacy during school transition. Interestingly, PASE significantly improved in the Y10 leaders compared with the control school, thus demonstrating that although leadership opportunities were promoted the desired secondary outcome of improving PASE was achieved. School connectedness decreased in both schools suggesting this is still something that schools need to address during this challenging transition period.

APPENDIX B: PEER-REVIEWED SCIENTIFIC CONFERENCE ORAL PRESENTATIONS

2. Jenkinson, K. A. & Benson, A. C. Barriers to providing physical education in secondary schools: Can we engage students? *ACHPER International Conference: Moving, Learning & Achieving*. Prince Alfred College, Adelaide, Australia, 18-20th April, 2011.

75. Barriers to providing Physical Education in Secondary Schools: Can we Engage Students?

Kate Jenkinson, RMIT University, (SY, TY, R)

The proportion of a student's day that is spent within the school environment ensures that schools and physical educators are well positioned to promote health and physical activity behaviours to students. However, the barriers to participation in and provision of physical education experienced by both teachers and students, and those imposed by the school as an institution are increasingly impacting on the role that physical education plays within schools. These institutional, teacher and student-related barriers have not changed substantially over time however they have evolved and become more complex in their own context.

An on-line questionnaire was completed by 115 physical education teachers from Victorian State Secondary schools. It determined that the barriers to providing quality physical education programs were largely institutional including accessing facilities $\bar{x}$=8.10 (2.3), suitable teaching spaces $\bar{x}$=7.95 (2.15), and equipment $\bar{x}$=7.37 (2.10). In addition, the barriers perceived by teachers to impact on students' participation in school-based physical education and physical activity were also examined. Over two-thirds of teachers recognised their own difficulties in engaging students when teaching as a potential limitation on student participation. Teachers also perceived that students were influenced by their peers (62 per cent) and their own low levels of interest in physical activity (45 per cent) when choosing to participate.

To ensure an effective active curriculum and to enable teachers to implement engaging physical education programs within their schools, an awareness of these institutional, teacher- and student-related barriers is essential. However, of greater importance is the ability of teachers to develop and apply teaching strategies and skills to overcome barriers that are within their capacity to change; some of which will be explored.

APPENDIX B: PEER-REVIEWED SCIENTIFIC CONFERENCE ORAL PRESENTATIONS

3. Jenkinson, K. A. & Benson, A. C. State secondary school physical educators' knowledge of the Victorian physical education & sport mandate. *A Step Ahead: The Higher Degrees by Research Student Conference*. RMIT University, Melbourne, Australia, 23rd October, 2009.

4. Jenkinson, K. A. & Benson, A. C. State secondary school physical educators' knowledge of the Victorian physical education & sport mandate. *Postgraduate Conference.* RMIT University, Melbourne, September, 2009.
Awarded: Best First Year Postgraduate Oral Presentation

State secondary school physical educators' knowledge of the Victorian physical education & sport mandate

Physical Education's primary role in schools is education of the physical and through the physical to develop the affective, cognitive and psychomotor domains. At present, Victorian State Secondary schools have a mandate of 100 minutes of Physical Education and 100 minutes of Sport per week across compulsory levels (Year7-10)[1]. International studies and those from other Australian States highlight many discrepancies between Physical Education policies and their implementation worldwide. There is currently no published data in Victoria regarding schools' ability to meet this mandate. Therefore, the purpose of this study was to investigate specialist Physical Education teachers' knowledge of and ability to implement the mandate within their Victorian State Secondary school.

A total of 115 State Secondary school teachers responded to an online questionnaire (48 Heads of Physical Education; 67 Physical Education teachers). Respondents taught in schools that were Metropolitan (n=81), Rural (n=29) or Remote (n=5). Of the 115 teachers, only 48% had correct knowledge of the Victorian mandate. There was a significant association between the size of the school and reported ability to meet the mandated requirements of 100 minutes per week of Physical Education in Year 7 ($x^2(1)= 4.46$, $p=0.035$), Year 8 ($x^2(1)= 4.97$, $p=0.026$) and Year 9 ($x^2(1)=4.24$, $p=0.039$). Smaller schools (≤ 800 students) were less likely to meet the mandated Physical Education requirement at Year 7 ($z=-1.3$), Year 8 ($z=-1.5$) and Year 9 ($z=-1.2$) compared to larger schools. Although Physical Education is compulsory in Victorian State Secondary schools until Year 10, less than half of Physical Education teachers surveyed were able to report the correct mandate requirements, emphasising the challenge of disseminating policy to teachers and consequently the impact of this on its implementation in schools.

1.Victorian Department of Education and Early Childhood Development. (2007). *Curriculum Advice: Physical and Sport Education Policy*. Melbourne: Victorian Government.

APPENDIX C: PEER-REVIEWED SCIENTIFIC CONFERENCE POSTER PRESENTATIONS

1. Jenkinson, K. A., & Benson, A. C. Physical education teachers' knowledge, implementation of policy and barriers associated with physical education and physical activity. *The Higher Degrees by Research Student Conference – Vision To Reality.* RMIT University, Melbourne, Australia, 21st October, 2011.
Awarded: Highly Commended Poster

2. Jenkinson, K. A., & Benson, A. C. Physical education teachers' knowledge, implementation of policy and barriers associated with physical education and physical activity. *International Society for Behavioural Nutrition and Physical Activity* (June, 2011). Melbourne Convention and Exhibition Centre, Australia, 16th-18thJune, 2011.

Physical Education Teachers' Knowledge, Implementation of Policy and Barriers Associated with Physical Education and Physical Activity

RMIT UNIVERSITY

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RMIT UNIVERSITY

Introduction

This presentation reports physical education (PE) teachers' knowledge and implementation of the Victorian physical education and sport education policy (Victorian mandate) in their State Secondary School. The mandate requires that across Years 7-10, students are provided with 100 minutes per week of physical education and 100 minutes per week of sport education.[1] In addition, barriers to student participation and provision of school PE and physical activity were also investigated.

Methods

An on-line questionnaire was completed by 115 PE teachers in Victorian State Secondary schools to determine their awareness, knowledge and adoption of the Victorian mandate. Teachers also ranked from most ('10') to least ('1') influential, factors affecting their PE and physical activity provision, and the five barriers they perceived restricted their students from being active at school. Analysis consisted of frequency statistics and the standard residual was calculated to investigate the strength of the relationships determined using cross tabs with Pearson's chi square analysis.

Types of Barriers to Physical Education & Physical Activity

The barriers reported by teachers can be categorised as:

Institutional barriers: Imposed by the school and outside the teachers control. (Example: Adequate facilities and equipment, funding, crowded curriculum).[2]

Teacher-related barriers: arising from the teachers behaviour (Example: Knowledge, providing appropriate content, motivation, qualifications, attitudes, planning.[2]

Student-related barriers: imposed by students themselves (Example: Peer pressure, lack of motivation, lure of sedentary behaviour, dislike for activity).[3]

Results

Knowledge & Implementation of Policy

- 64% of PE teachers surveyed were aware of the Victorian mandate; only 48% correctly reported the mandated requirements of time and content.
- Teachers reported 23-33% compliance to the Victorian mandate in PE and 2-3% in sport education across year levels.
- Smaller schools found it more difficult to meet the PE mandate at Year 7($\chi^2(1)(1)=4.464$, $p=0.035$; z=–1.3), Year 8 ($\chi^2(1)=4.976$, $p=0.026$; z=–1.5) and Year 9 ($\chi^2(1)=4.246$, $p=0.039$; z=–1.2).[4]
- Schools were more likely to meet the PE mandate than sport education mandate.

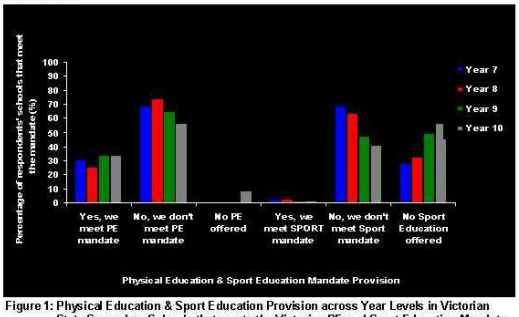

Figure 1: Physical Education & Sport Education Provision across Year Levels in Victorian State Secondary Schools that meets the Victorian PE and Sport Education Mandate

Barriers to Physical Education Provision in Schools

The barriers teachers ranked from most ('10') to least ('1') influential in affecting their PE and physical activity provision were institutional.

Table 1: Victorian State Secondary School Specialist Physical Education Teachers' Barriers to the provision of PE and Physical activity in their school.

Barriers to providing quality physical education (n=70)	Rank order most ('10') to least ('1') important	Mean	SD	Barrier category
Access to facilities	**10**	**8.10**	**2.30**	**I**
Access to suitable teaching spaces	**9**	**7.95**	**2.15**	**I**
Access to equipment	**8**	**7.37**	**2.10**	**I**
Timetabling	7	6.17	2.50	I
Support from other staff	6	5.15	2.56	I
Funding for the subject	5	4.74	2.43	I
Support from management and administration	4	4.17	2.30	I
Leadership from heads of department	3	4.15	2.59	I
Access to professional development that is appropriate	2	4.00	2.13	I
Access to professional development from school management or leadership team	1	3.17	2.19	I

I=Institutional barrier

Teachers Perceived Barriers to adolescent participation in Physical Education & Physical Activity

- 29% ranked the crowded curriculum as the most influential barrier.
- 67% ranked their own difficulty engaging students most within the top five barriers).[3]

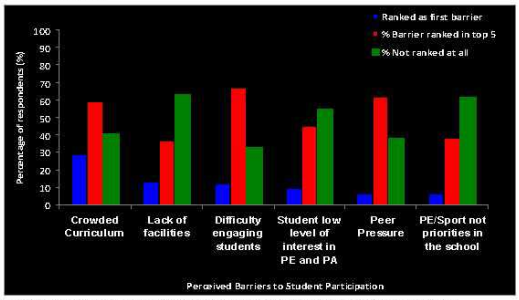

Figure 2: Victorian State Secondary School Specialist Physical Education Teachers' Perceived Top Five Barriers to Students Accessing PE and Physical Activity in Schools.

Conclusions

- Schools have been identified as key health settings.[4] Importantly they have a role to play in influencing physical activity and health related behaviours and choices of students.
- Despite mandated PE, sport education and physical activity policies for schools, there is considerable variation between policy and implementation, often due to institutional, teacher and student related barriers.
- An increased awareness of these barriers among all teachers is of vital importance. Promoting this awareness will support the continuing development of quality PE programs, teaching strategies and teaching skills required to overcome these barriers, both now and into the future.

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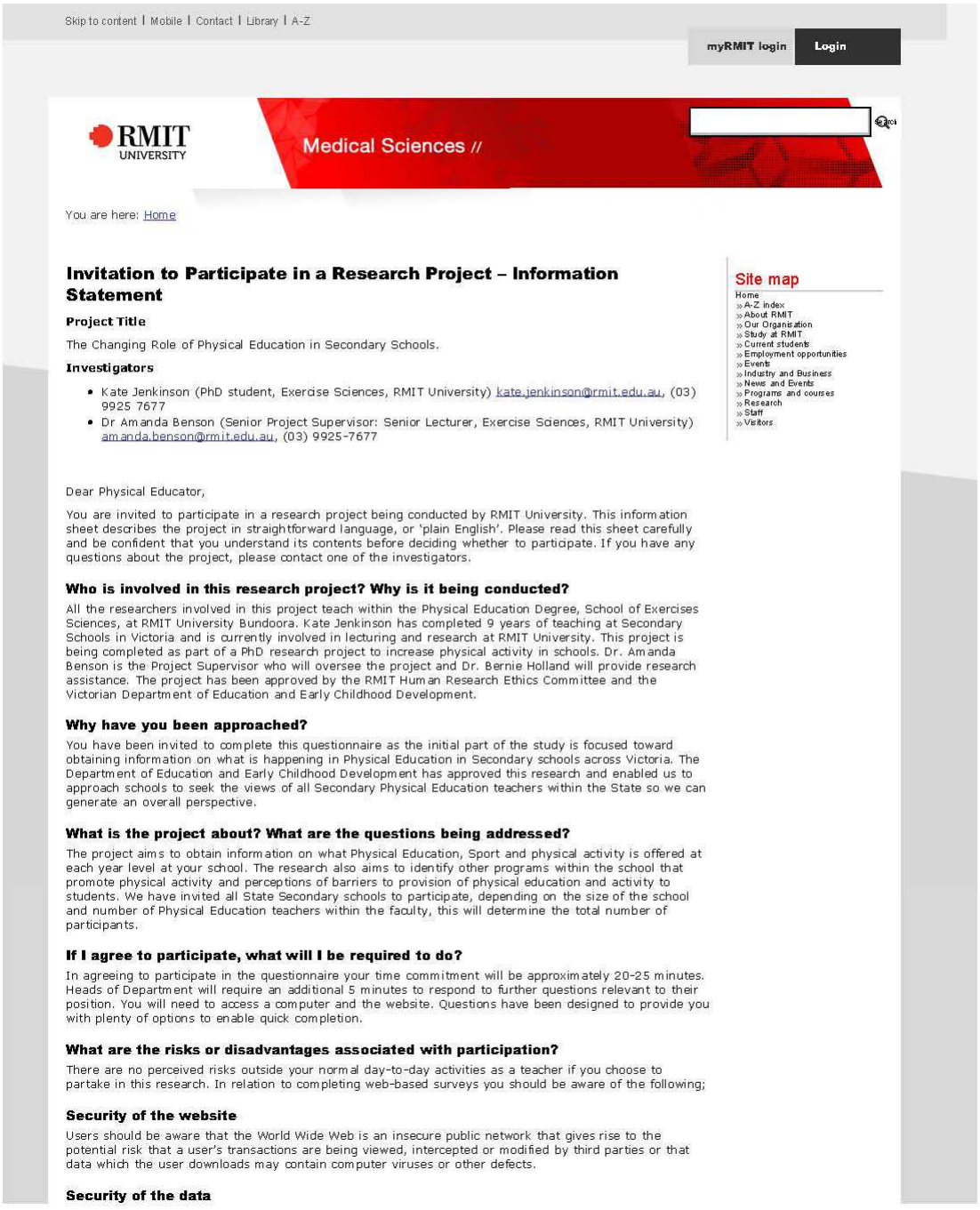
APPENDIX D: VICTORIAN STATE SECONDARY SCHOOL PHYSICAL EDUCATION TEACHERS QUESTIONNAIRE (online format)



Invitation to Participate in a Research Project – Information Statement

Project Title

The Changing Role of Physical Education in Secondary Schools.

Investigators

- Kate Jenkinson (PhD student, Exercise Sciences, RMIT University) kate.jenkinson@rmit.edu.au, (03) 9925 7677
- Dr Amanda Benson (Senior Project Supervisor: Senior Lecturer, Exercise Sciences, RMIT University) amanda.benson@rmit.edu.au, (03) 9925-7677

Dear Physical Educator,

You are invited to participate in a research project being conducted by RMIT University. This information sheet describes the project in straightforward language, or 'plain English'. Please read this sheet carefully and be confident that you understand its contents before deciding whether to participate. If you have any questions about the project, please contact one of the investigators.

Who is involved in this research project? Why is it being conducted?

All the researchers involved in this project teach within the Physical Education Degree, School of Exercises Sciences, at RMIT University Bundoora. Kate Jenkinson has completed 9 years of teaching at Secondary Schools in Victoria and is currently involved in lecturing and research at RMIT University. This project is being completed as part of a PhD research project to increase physical activity in schools. Dr. Amanda Benson is the Project Supervisor who will oversee the project and Dr. Bernie Holland will provide research assistance. The project has been approved by the RMIT Human Research Ethics Committee and the Victorian Department of Education and Early Childhood Development.

Why have you been approached?

You have been invited to complete this questionnaire as the initial part of the study is focused toward obtaining information on what is happening in Physical Education in Secondary schools across Victoria. The Department of Education and Early Childhood Development has approved this research and enabled us to approach schools to seek the views of all Secondary Physical Education teachers within the State so we can generate an overall perspective.

What is the project about? What are the questions being addressed?

The project aims to obtain information on what Physical Education, Sport and physical activity is offered at each year level at your school. The research also aims to identify other programs within the school that promote physical activity and perceptions of barriers to provision of physical education and activity to students. We have invited all State Secondary schools to participate, depending on the size of the school and number of Physical Education teachers within the faculty, this will determine the total number of participants.

If I agree to participate, what will I be required to do?

In agreeing to participate in the questionnaire your time commitment will be approximately 20-25 minutes. Heads of Department will require an additional 5 minutes to respond to further questions relevant to their position. You will need to access a computer and the website. Questions have been designed to provide you with plenty of options to enable quick completion.

What are the risks or disadvantages associated with participation?

There are no perceived risks outside your normal day-to-day activities as a teacher if you choose to partake in this research. In relation to completing web-based surveys you should be aware of the following;

Security of the website

Users should be aware that the World Wide Web is an insecure public network that gives rise to the potential risk that a user's transactions are being viewed, intercepted or modified by third parties or that data which the user downloads may contain computer viruses or other defects.

Security of the data

This project will use an internal site to create, collect and analyse data collected in a survey format. If you agree to participate in this survey, the responses you provide to the survey will be stored on a host server that is used by RMIT University. Once we have completed our data collection and analysis, we will import the data we collect to the Medical Sciences server where it will be stored securely for a period of five (5) years. The data on the RMIT host server will then be deleted and expunged. If you are unduly concerned about your responses to any of the questionnaire items or if you find participation in the project distressing, you should contact Kate Jenkinson, as soon as convenient or Dr Amanda Benson or Dr. Bernie Holland. They can discuss your concerns with you confidentially and suggest appropriate follow-up, if necessary.

What are the benefits associated with participation?

The benefits to you include an awareness of barriers to your provision of Physical Education and potential strategies to overcome these barriers. Importantly it will gather successful current initiatives within schools to enable awareness across the State of what is actually working within schools to get students active. Finally, your school can choose to be a part of our intervention project which we intend to roll out in 2009 and once implemented will continue to develop within your school for years to come.

What will happen to the information I provide?

Your information will be kept confidential, so only those researchers listed above will have access to the data. You will be an anonymous participant with only the last 4 digits of your VIT registration required. The results will be included in a paper for publication in an appropriate journal. The research data will be kept securely at RMIT for a period of 5 years before being destroyed. Because of the nature of data collection, we are not obtaining written informed consent from you. Instead, we assume that you have given consent by your completion and return of the questionnaire.

What are my rights as a participant?

As a participant, your rights include;

The right to withdraw their participation at any time, without prejudice; the right to have any unprocessed data withdrawn and destroyed, provided it can be reliably identified, and provided that so doing does not increase the risk for the participant and the right to have any questions answered at any time.

Your participation is entirely voluntary. You will not be disadvantaged in any way if you choose not to participate. If you do agree to participate you will be asked upon opening the survey to select the box that indicates you have read and understood this "plain English" statement regarding what the research entails. Should you choose to select the "proceed" button you will be gain access to the questionnaire. If you have not selected the box indicating your understanding of the project, you will be unable to access the questionnaire.

I have read and understood the above "Participant Information Statement".

Yes, proceed to survey

No, exit now

Whom should I contact if I have any questions?

Should you have any questions, please contact Kate Jenkinson or her supervisors Dr. Amanda Benson or Dr. Bernie Holland on the contact numbers or email below.

Kate Jenkinson

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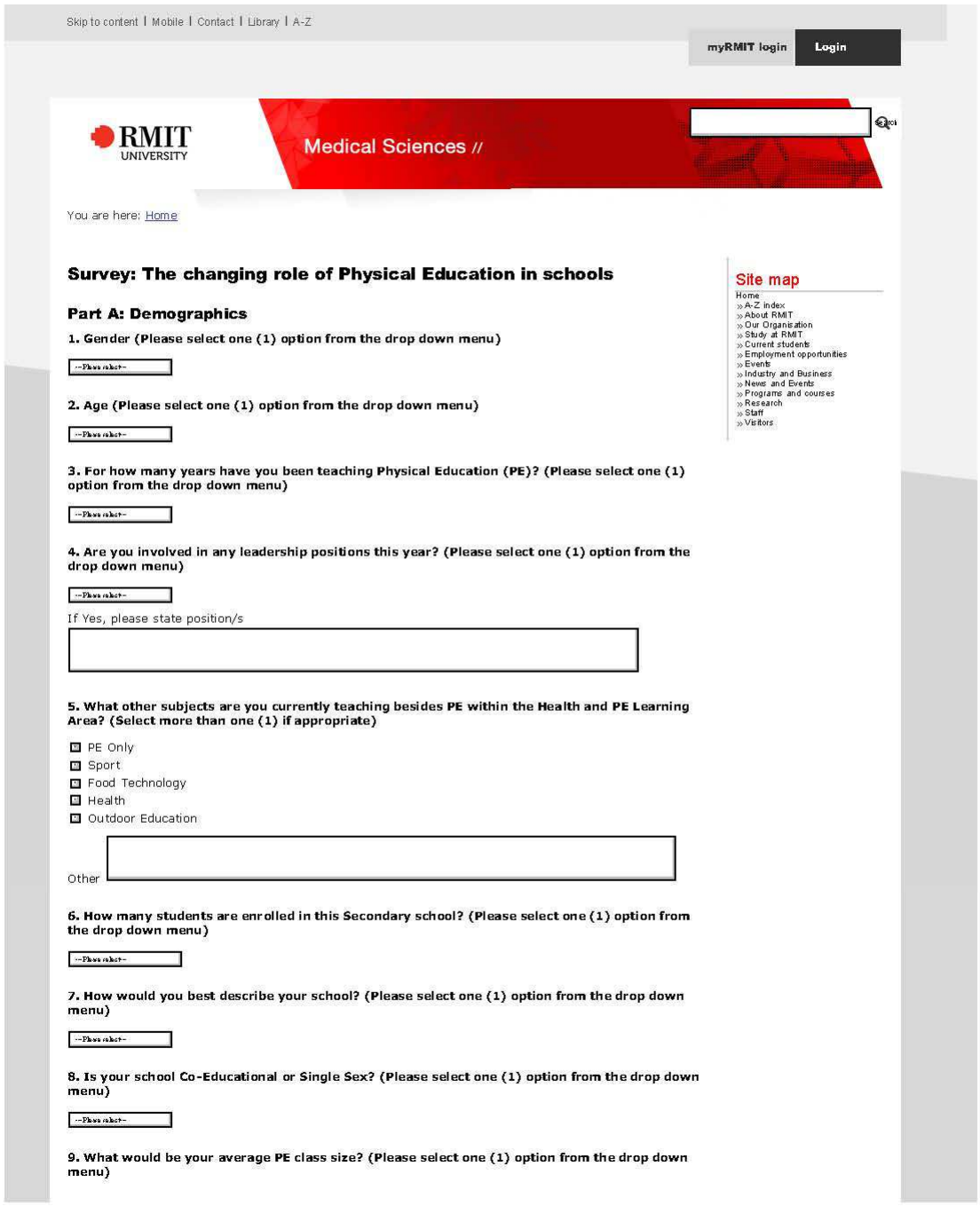
Any complaints about your participation in this project may be directed to:

Executive Officer
RMIT Human Research Ethics Committee,
Research & Innovation
RMIT University
GPO Box 2476
Melbourne, 3001.

Details of the complaints procedure is available at Complaints with respect to participation in research at RMIT.



Survey: The changing role of Physical Education in schools

Part A: Demographics

1. Gender (Please select one (1) option from the drop down menu)

--Please select--

2. Age (Please select one (1) option from the drop down menu)

--Please select--

3. For how many years have you been teaching Physical Education (PE)? (Please select one (1) option from the drop down menu)

--Please select--

4. Are you involved in any leadership positions this year? (Please select one (1) option from the drop down menu)

--Please select--

If Yes, please state position/s

5. What other subjects are you currently teaching besides PE within the Health and PE Learning Area? (Select more than one (1) if appropriate)

- ☐ PE Only
- ☐ Sport
- ☐ Food Technology
- ☐ Health
- ☐ Outdoor Education

Other

6. How many students are enrolled in this Secondary school? (Please select one (1) option from the drop down menu)

--Please select--

7. How would you best describe your school? (Please select one (1) option from the drop down menu)

--Please select--

8. Is your school Co-Educational or Single Sex? (Please select one (1) option from the drop down menu)

--Please select--

9. What would be your average PE class size? (Please select one (1) option from the drop down menu)

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---Please select---

10. How many *Full-Time* PE staff do you have in your school? (Please select one (1) option from the drop down menu)

---Please select---

11. How many *Part-Time* PE staff do you have in your school? (Please select one (1) option from the drop down menu)

---Please select---

12. What facilities do you have that provide space to teach practical lessons? (Select ALL that apply).

- ☐ Gym
- ☐ Hall
- ☐ Multi-purpose space
- ☐ Weights Room
- ☐ Dance/Aerobics studio
- ☐ Basketball courts
- ☐ Netball courts
- ☐ Outdoor Astro turf field/multi-purpose area
- ☐ Football oval
- ☐ Soccer Oval
- ☐ Tennis Courts
- ☐ Other

13. How would you rate the facilities/venues within the school you have to teach in? (Please select one (1) option from the drop down menu)

---Please select---

14. How would you rate the PE and Sport equipment provided for students within the school? (Please select one (1) option from the drop down menu)

---Please select---

15. What is the school's main priority area? (Please select one (1) option from the drop down menu)

---Please select---

Other

*** If SPORT / PE is not a priority, please select N/A in Q16*

16. If sport is the priority area, is your school a Sporting Excellence, Sporting Academy or Specialist Sporting School? (Please select one (1) option from the drop down menu).

---Please select---

17. In what sport/s does your school specialise?

- ⊙ None
- ○ Sports

18. How would you rate the importance of Physical Education within the whole school community? (Please select one (1) option from the drop down menu)

---Please select---

19. How is the subject of PE perceived by other colleagues, outside the Health and PE learning area, within the school? (Please select one (1) option from the drop down menu)

---Please select---

20. How is the subject of PE perceived by the administration within the school? (Please select one (1) option from the drop down menu)

---Please select---

21. Do you have an affiliation with any community sporting organisations? (Please select one (1) option from the drop down menu).

---Please select---

*** If No, please select N/A in Q22*

22. What is the greatest benefit this brings to your school? (Please select one (1) option from the drop down menu)

---Please select---

Other

Enter the last four digits of your VIT registration number.
(if you omit the number, all data will be lost and you will have to recommence the survey)

*

Submit Part A and go to Part B

Part B - Policies

23. What time allowance are the following subjects given per week when taught in your school? (Please select appropriate time per WEEK per YEAR level from the drop down menu).

Physical Education

Year 7 --Please select--

Year 8 --Please select--

Year 9 --Please select--

Year 10 --Please select--

Sport

Year 7 --Please select--

Year 8 --Please select--

Year 9 --Please select--

Year 10 --Please select--

OR schools with Physical Education and Sport Combined

(select N/A if your school has separate PE and Sport classes)

Year 7 --Please select--

Year 8 --Please select--

Year 9 --Please select--

Year 10 --Please select--

24. Have changes occurred over your teaching career that have reduced the amount of time allocated to PE and Sport within the curriculum? (Please select one (1) option from the drop down menu)

--Please select--

*** If No, please select N/A in Q25 and Q26.*

25. If time reductions have occurred, what have been the influences that have lead to this reduction?

Rank from MOST(1) to LEAST (10) influential.

--Please select-- Crowded curriculum

--Please select-- Lack of support from administration

--Please select-- Timetabling

--Please select-- Class sizes

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---Please select--- Lack of student interest

---Please select--- Lack of teacher interest

---Please select--- Reduction of qualified staff

---Please select--- Lack of facilities

---Please select--- Lack of equipment

---Please select--- Cost of implementing programs

☒ N/A

26. Are there other influences that have reduced PE and Sport time allocations within schools? (Please select one (1) option from the drop down menu)

---Please select---

** If Yes, Please explain:

27. Are you aware of the National Physical Activity Guidelines? (Please select one (1) option from the drop down menu)

---Please select---

*** If No, please select N/A in Q28, Q29 and Q30.*

28. How were you first informed of the National Physical Activity Guidelines? (Please select one (1) option from the drop down menu)

---Please select---

Other

29. What are the current National Physical Activity Guidelines relating to Adolescents? (SELECT and complete total minutes/hours per day as appropriate)

◉ N/A
○ Unsure
○ The NPAG's are as follows;

minutes per day of Moderate to Vigorous Activity

hours a day of activity

30. Are the National Physical Activity Guidelines taught within your school curriculum? (Please select one (1) option from the drop down menu)

---Please select---

Other

31. Are you aware of the Federal Government mandate on physical activity in schools? (Please select one (1) option from the drop down menu)

---Please select---

*** If No, please select N/A in Q32 and Q33.*

32. How were you first informed of the Federal Government mandate on physical activity in schools? (Please select one (1) option from the drop down menu).

---Please select---

Other

33. What is the current Federal Government mandate for physical activity per week in schools? (SELECT and complete total hours per week as appropriate)

- ⊙ N/A
- ○ Unsure
- ○ The Federal Government mandate is;

[ ] hours per week of physical activity per week in schools

34. Are you aware of the Victorian Department of Education Policy for PE and Sport in Secondary Schools?(Please select one (1) option from the drop down menu).

[---Please select---]

*** If No, Please select N/A in Q35 and Q36.*

35. How were you first informed of the Victorian Department of Education Policy for PE and Sport in Secondary Schools? (Please select one (1) option from the drop down menu).

[---Please select---]

Other [ ]

36. What is the current Victorian Department of Education Policy for PE and Sport recommendation per week?(SELECT and complete total minutes/hours per day as appropriate)

- ⊙ N/A
- ○ Unsure
- ○ The Victorian Department Policy for PE and Sport is;

PE [ ] minutes per week

Sport [ ] minutes per week

Enter the last four digits of your VIT registration number.
(if you omit the number, all data will be lost and you will have to recommence the survey)

[3333] *

[Submit Part B] and go to Part C

Part C: Individual Teacher Focus

37. Select the three (3) most important reasons as to why you chose to teach PE.

- [ ] I enjoy working with children
- [ ] I coached sport as a junior and wanted to continue in similar role
- [ ] I played sport as a junior and wanted to pass on passion for sport to others
- [ ] One or both my parents were/are teachers of Physical Education
- [ ] I enjoyed being and wanted to work in a structured school environment
- [ ] I like teaching games
- [ ] I want to see children having fun
- [ ] Other

38. Select three (3) reasons that best describe why you are CURRENTLY teaching PE.

- [ ] I want to ensure students get opportunities at school to be active
- [ ] I want to educate students on lifestyle choices regarding exercise
- [ ] I believe I can encourage all students to participate in Physical Education
- [ ] It keeps me active mentally and physically
- [ ] I enjoy working with children
- [ ] I encourage and enjoy the competitive nature of children
- [ ] I like the flexibility of teaching
- [ ] I like coaching teams and individual students
- [ ] I enjoy working with my colleagues
- [ ] I like that every day is different in teaching
- [ ] Other

39. Rank from MOST (1) to LEAST (10) the skills you think are important for PE teachers to possess?

--Please select--	Flexibility
--Please select--	Organisation
--Please select--	Good teaching skills
--Please select--	Understanding of skill development and acquisition
--Please select--	Knowledge of content
--Please select--	Ability to build rapport with students
--Please select--	Communication
--Please select--	Willingness to learn from others
--Please select--	Cooperation
--Please select--	Work within a team

40. Rank the factors that influence your teaching of PE in order from MOST (1) to LEAST influential (10).

--Please select--	Access to Facilities
--Please select--	Access to equipment
--Please select--	Access to suitable teaching spaces
--Please select--	Timetabling

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---Please select--- Access to Professional Development from school administration
---Please select--- Access to Professional development that is appropriate
---Please select--- Support from Administration
---Please select--- Support from other staff
---Please select--- Leadership from Head of Department
---Please select--- Funding for the subject

41. Do you have access to Professional Development opportunities? (Please select one (1) option from the drop down menu).

---Please select---

42. What is the major influence on your access to Professional Development? (Please select one (1) option from the drop down menu).

---Please select---

Other

43. Do you think the range of Professional Development programs in Victoria meets the needs of PE Teachers from ALL teaching experience levels?(Please select one (1) option from the drop down menu).

---Please select---

If No, Please Explain:

44. How often does your department review and/or update the PE curriculum? (Please select one (1) option from the drop down menu).

---Please select---

Other

45. What are the three (3) most important factors that promote changes in the curriculum at your school? (Please select only three (3) options).

- Education Department guidelines/policies
- Popularity of different sports
- Expertise of staff
- Facilities and Equipment
- Access to venues
- Climate
- Emerging role models
- Emerging "trendy" sports
- Seasonal/yearly events
- Other

46. What do you perceive to be the differences between PE and Sport?

PE is

Sport is

47. Do you think that SPORT and PE should be one subject? (Please select one (1) option from the drop down menu).

---Please select---

Please explain your selection:

48. Is PE or Sport held in higher regard in your school? (Please select one (1) option from the drop down menu).

---Please select---

49. Select the 5 most significant barriers that restrict students being active *inside* the school

Rank from MOST (1) to LEAST (5) significant.

---Please select---	PE/Sport are not priorities for students at the school
---Please select---	Low level of interest in Physical Education and general activity
---Please select---	Difficulty in engaging students in physical activity
---Please select---	Crowded curriculum
---Please select---	Outdated curriculum doesn't encourage participation
---Please select---	Large class sizes
---Please select---	Lack of facilities
---Please select---	Lack of equipment
---Please select---	Cost of involvement in activities
---Please select---	The school environment does not encourage physical activity
---Please select---	PE/Sport staff will not provide limited opportunity for activity inside classtime
---Please select---	Focus of curriculum is on too many traditional sports
---Please select---	Peer pressure to pursue other activities
---Please select---	"Semesterisation"- lack of consecutive units
---Please select---	Past negative experiences with PE
---Please select---	Staff use outdated teaching methods

Other

50. Select the 5 most significant barriers that restrict students being active *outside* the school.

Rank from MOST(1) to LEAST(5) significant.

---Please select---	No organised activities available
---Please select---	Access to community facilities
---Please select---	Parental support
---Please select---	Money to fund extra sporting activities
---Please select---	Students prefer more sedentary pastimes
---Please select---	Sport and physical activity are not valued by the community
---Please select---	Access to competition is too far away
---Please select---	Access to individual sports is limited
---Please select---	Access to alternative activities is limited

Other

51. What are your perceptions of the fitness levels of the students at each year level in your school? (Please select one (1) option from the drop down menu for EACH year level).

Year 7 ---Please select---

Year 8 ---Please select---

Year 9 ---Please select---

Year 10 ---Please select---

Senior School ---Please select---

52. Is there are theoretical component to PE in your curriculum? (Please select one (1) option from the drop down menu).

---Please select---

*** If No, please select N/A in Q53*

53. If Yes, at what year levels is it taught? (Please select more than one (1) if appropriate).

- ☐ N/A
- ☐ Year 7
- ☐ Year 8
- ☐ Year 9
- ☐ Year 10

54. What is the ratio of practical to theory of your typical PE class? (Please select one (1) option from the drop down menu).

---Please select---

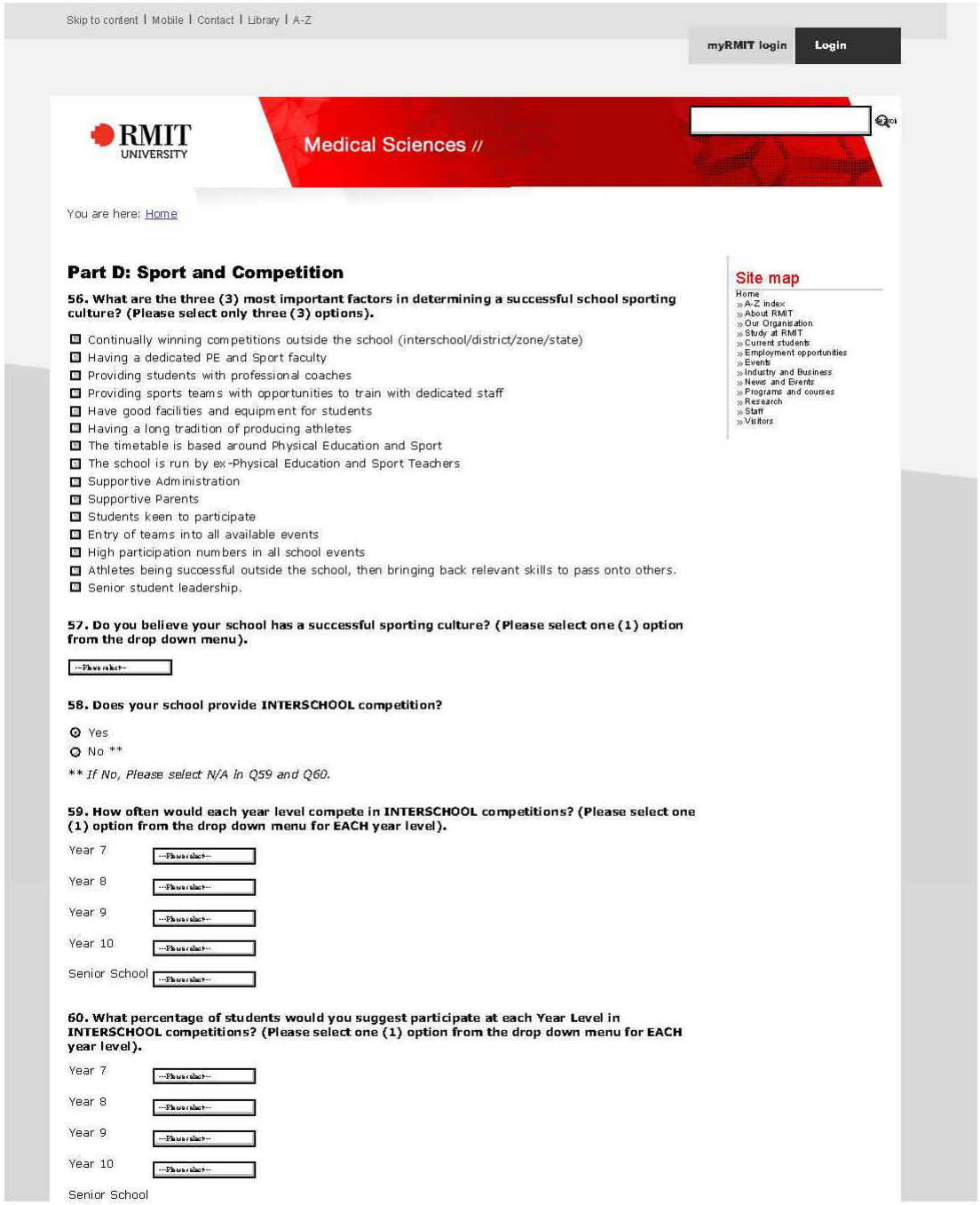
55. Is Health taught as a separate subject to PE or is it combined? (Please select (1) option from the drop down menu)

---Please select---

Enter the last four digits of your VIT registration number.
(if you omit the number, all data will be lost and you will have to recommence the survey)

*

Submit Part C and go to Part D



Part D: Sport and Competition

56. What are the three (3) most important factors in determining a successful school sporting culture? (Please select only three (3) options).

- ☐ Continually winning competitions outside the school (interschool/district/zone/state)
- ☐ Having a dedicated PE and Sport faculty
- ☐ Providing students with professional coaches
- ☐ Providing sports teams with opportunities to train with dedicated staff
- ☐ Have good facilities and equipment for students
- ☐ Having a long tradition of producing athletes
- ☐ The timetable is based around Physical Education and Sport
- ☐ The school is run by ex-Physical Education and Sport Teachers
- ☐ Supportive Administration
- ☐ Supportive Parents
- ☐ Students keen to participate
- ☐ Entry of teams into all available events
- ☐ High participation numbers in all school events
- ☐ Athletes being successful outside the school, then bringing back relevant skills to pass onto others.
- ☐ Senior student leadership.

57. Do you believe your school has a successful sporting culture? (Please select one (1) option from the drop down menu).

--Please select--

58. Does your school provide INTERSCHOOL competition?

- ◉ Yes
- ○ No **

*** If No, Please select N/A in Q59 and Q60.*

59. How often would each year level compete in INTERSCHOOL competitions? (Please select one (1) option from the drop down menu for EACH year level).

Year 7 --Please select--

Year 8 --Please select--

Year 9 --Please select--

Year 10 --Please select--

Senior School --Please select--

60. What percentage of students would you suggest participate at each Year Level in INTERSCHOOL competitions? (Please select one (1) option from the drop down menu for EACH year level).

Year 7 --Please select--

Year 8 --Please select--

Year 9 --Please select--

Year 10 --Please select--

Senior School

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---Please select---

61. Does your school provide the following sports carnivals? (Please select one (1) option from the drop down menu corresponding with each event).

Swimming ---Please select---

Athletics ---Please select---

Cross country/Fun Run ---Please select---

*** If No to ALL, Please select N/A in Q62 and Q63.*

62. What *percentage* of students from your school would you suggest actively participate in each carnival? (Please select one (1) option from the drop down menu for EACH carnival).

Swimming ---Please select---

Athletics ---Please select---

Cross Country ---Please select---

63. Are the above carnivals or other school sporting events in a competition involving HOUSES/or TEAMS/ or COLOURS? (Please select one (1) option from the drop down menu).

(Where students are assigned to a sports house/team/colour and stay within that team for the year or possibly school career; they compete at each event for points with an overall winning house)

---Please select---

*** If No, Please select N/A in Q64, Q65, Q66 and Q67.*

64. If your school does have house events, do you have Sport/PE HOUSE captains/leaders? (Please select one (1) option from the drop down menu).

---Please select---

*** If No, please select N/A in Q65, Q66 and Q67.*

65. At what year levels are these Sport/PE House captains elected. (Please select more than one (1) year level if appropriate)

- ☐ Year 7
- ☐ Year 8
- ☐ Year 9
- ☐ Year 10
- ☐ Year 11
- ☐ Year 12
- ☐ N/A

66. Do SPORT/HOUSE captains have a role outside their participation in and promotion of carnivals? (Please select one (1) option from the drop down menu).

---Please select---

** If No, please select N/A in Q67.

67. If Yes, what are they involved in and what contribution do they make to the school?

◉ N/A

Contribution to School:

68. Does your school provide students with INTERCLASS/FORM competitions outside PE and Sport class time? (Please select one (1) option from the drop down menu).

---Please select---

** If No, Please select N/A in Q69 and Q70.

69. If Yes, When are these available? (Please select more than one (1) if appropriate).

- ☐ Before school
- ☐ Lunch time

- [ ] After-school
- [ ] N/A
- [ ] Other

70. What *percentage* of students do you think would compete in INTERCLASS/FORM competitions? (Please select one (1) option from the drop down menu for EACH year level).

Year 7 ---Please select---

Year 8 ---Please select---

Year 9 ---Please select---

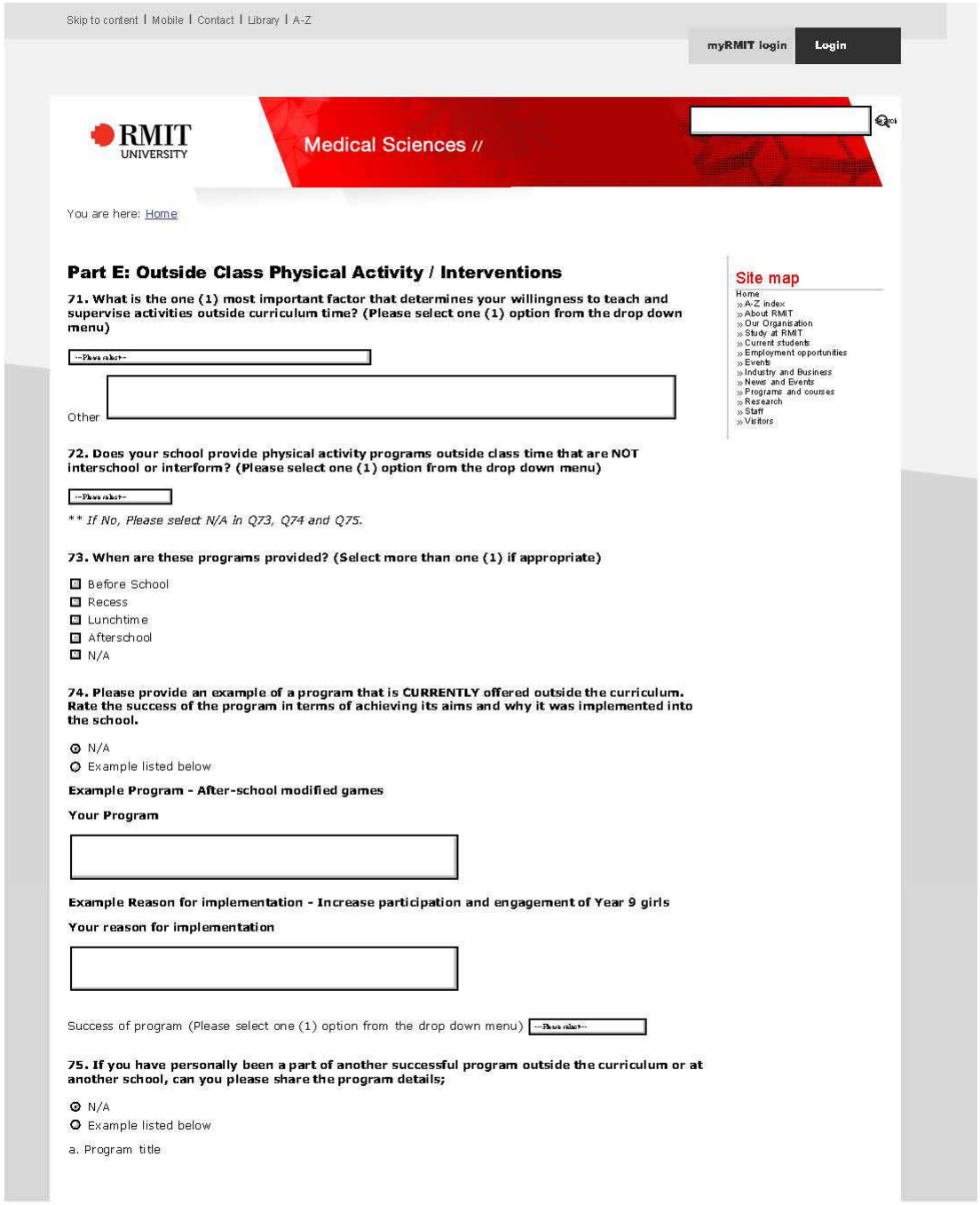
Year 10 ---Please select---

Senior School ---Please select---

Enter the last four digits of your VIT registration number.
(if you omit the number, all data will be lost and you will have to recommence the survey)

*

Submit Part D and go to Part E



Part E: Outside Class Physical Activity / Interventions

71. What is the one (1) most important factor that determines your willingness to teach and supervise activities outside curriculum time? (Please select one (1) option from the drop down menu)

--Please select--

Other

72. Does your school provide physical activity programs outside class time that are NOT interschool or interform? (Please select one (1) option from the drop down menu)

--Please select--

** *If No, Please select N/A in Q73, Q74 and Q75.*

73. When are these programs provided? (Select more than one (1) if appropriate)

- ☐ Before School
- ☐ Recess
- ☐ Lunchtime
- ☐ Afterschool
- ☐ N/A

74. Please provide an example of a program that is CURRENTLY offered outside the curriculum. Rate the success of the program in terms of achieving its aims and why it was implemented into the school.

- ◉ N/A
- ○ Example listed below

Example Program - After-school modified games

Your Program

Example Reason for implementation - Increase participation and engagement of Year 9 girls

Your reason for implementation

Success of program (Please select one (1) option from the drop down menu) --Please select--

75. If you have personally been a part of another successful program outside the curriculum or at another school, can you please share the program details;

- ◉ N/A
- ○ Example listed below

a. Program title

b. Purpose of program

c. Why it has been successful?

d. Could you implement it into other schools?

- (•) Yes
- ( ) No

e. What is the impact it has had on students?

76. What do you believe are the most important influences on the continual development of PE as a subject in the next 5 years?

Rank from MOST (1) to LEAST (5) important influence.

---Please select--- Ageing population of teachers

---Please select--- Dominance of other subject areas and priorities

---Please select--- Not enough younger staff and graduates in the profession

---Please select--- Being expected to solve priority areas such as increased obesity and decreases in physical activity

---Please select--- Undervalued role as a PE teacher- you just play games!

---Please select--- Uncertainty of where PE stands within the whole school curriculum

---Please select--- Lack of knowledge of what the "core" curriculum of PE is

---Please select--- PE, Sport and Health all get "lumped" together

---Please select--- Lack of defined career paths for students from PE and subjects within the Key Learning Area

---Please select--- The impending National Curriculum

This is the END of the questionnaire.

Thank you for your valuable contribution.

If you wish to go into the draw for the Ross Hayward $200 Voucher, please leave your school email address

Enter the last four digits of your VIT registration number.

(if you omit the number, all data will be lost and you will have to recommence the survey) *

Submit

APPENDIX E: INTERVENTION QUESTIONNAIRES

1. GLAMA & BLAST YEAR 10 Peer Leaders Questionnaire

Name_____ **Form**_____ **Date**_____/_____/20___

RMIT University
School of Medical Sciences
Discipline of Exercise Sciences
PO Box 71, Bundoora VIC 3083
www.rmit.edu.au

GLAMA & BLAST

PEER SUPPORT AND LEADERSHIP PROGRAM

PARTICIPANT SURVEY

INSTRUCTIONS

This questionnaire asks you about your thoughts, feelings and attitudes about yourself, physical activity, leadership and your school.

- There are NO right or wrong answers.
- We would like you to answer all the questions as accurately and honestly as you can.
- If you don't understand any of the questions or words, please ask for help.
- This is about you and what you think and this information is very important to us.
- Make sure you fill in your name, form and date on each page.

Thank you

Name_____ **Form**_____ **Date**_____/_____/20___

Physical activity is any activity that increases your heart rate and makes you get out of breath some of the time. Physical activity can be done in sports, playing with friends, or walking to school. Some examples of physical activity are running, brisk walking, rollerblading, biking, skateboarding, dancing, swimming, soccer, basketball, football and surfing.

Q1a. ***Please circle HOW MANY days of activity you do per week***

Q1b. TICK (√) the box that applies under that day

DAYS OF ACTIVITY per week 0 1 2 3 4		**DAYS OF ACTIVITY per week** 5 6
Do you think you will start doing 60 minutes of physical activity 5 or more days a week in the next 6 months? (Please √)		**How many months have you been doing 60 minutes of physical activity on 5 or more days per week? (Please √)**
No, and I do not intend to in the next 6 months ☐ Yes, I intend to in the next six months ☐ Yes, I intend to in the next 30 days ☐		Less than 6 months ☐ 6 months or more ☐

Hagler, Calfas, Norman, Sallis, & Patrick, 2006.

Q2. The following statements are different beliefs about physical activity.
Please rate **HOW IMPORTANT** each statement is to your decision to do physical activity
(Place a √in the box that is true for you.)

Is this something that is important to you when you decided to do physical activity?	**Not important**	**Slightly important**	**Moderately important**	**Very important**	**Extremely important**
I would feel embarrassed if people saw me doing physical activity.					
Physical activity would help me stay fit.					
My parents would be happy if I did physical activity.					
There is too much I would have to learn to do physical activity.					
I would feel better about myself if I did physical activity.					
I would need too much help from my parents to do physical activity.					
I do not like the way physical activity and exercise makes me feel.					
I would have fun doing physical activity or playing sports with my friends.					
I would have more energy if I did physical activity					
Physical activity takes time away from being with friends.					

Hagler, Calfas, Norman, Sallis, & Patrick, 2006.

Example:
*This statement is **NOT TRUE** for me, so it is not important for me*
*This statement is **TRUE a little** for me, so it is slightly important*
*This statement is **TRUE** for me, so it is moderately important*
*This statement is **usually TRUE** for me, so it is very important*
*This statement is **always TRUE** for me, so it is extremely important*

Name_____ **Form**_____ **Date**_____/_____/20___

Q3. For each statement below, select the response which best represents how much you "disagree" or "agree" with it.

Mark your response by **ticking the box (√) beside the number** in the correct column.

	Disagree a lot	Disagree a little	Neither agree or disagree	Agree a little	Agree a lot
I can be physically active during my free time on most days.	☐1	☐2	☐3	☐4	☐5
I can ask my parent or other adult to do physically active things with me.	☐1	☐2	☐3	☐4	☐5
I can be physically active during my free time on most days even if I could watch TV or play video games instead.	☐1	☐2	☐3	☐4	☐5
I can be physically active during my free time on most days even if it is very hot or cold outside.	☐1	☐2	☐3	☐4	☐5
I can ask my best friend to be physically active with me during my free time on most days.	☐1	☐2	☐3	☐4	☐5
I can be physically active during my free time on most days even if I have a lot of homework.	☐1	☐2	☐3	☐4	☐5
I have the coordination I need to be physically active during my free time on most days.	☐1	☐2	☐3	☐4	☐5
I can be physically active during my free time on most days no matter how busy my day is.	☐1	☐2	☐3	☐4	☐5

Dishman, R. K. et al, 2004.

Q4. These questions are about YOU.

For each statement below *place a tick (√) in the box* that is true for YOU.

	Not at all True	Hardly True	Moderately True	Exactly True
I can always solve difficult problems if I try hard enough				
I know I can handle unforeseen situations well				
It is easy for me to stick to a plan and accomplish my goals				
I can deal confidently with unexpected events				
If someone opposes me, I find a way to get what I want				
I can solve most problems if I put my mind to it				
I am usually calm when facing difficulties				
If I am confronted with a problem, I can usually come up with a solution				
When I am in trouble, I can usually think of something to do				
No matter what comes my way, I will usually be able to handle it				

Schwarzer & Jerusalem, 1995

Name_____ **Form**_____ **Date**_____/_____/20___

Q5.These questions are about Leadership.

Please rate how much YOU agree with each statement by putting a tick (√) the box.

	Disagree a lot	Disagree a little	Neither agree or disagree	Agree a little	Agree a lot
I like being a leader					
I think I am a good leader					
I am excited to have this opportunity to lead others					
I am good at listening to the opinion of other students					
Considering the needs of other students is difficult for me					
I am good at setting group goals					
I am not comfortable speaking in front of a group					
Organizing other students is hard for me					
I can motivate other students					
Other students trust me					
It is not easy for me to get the respect of other students					
I find disputes/conflicts hard to deal with					
I make good decisions when I know the facts					
I communicate well when working in a group					
I am very organised					
When taking on challenges I work well with others					
I think on my feet and can make good decisions under pressure					
I ask for help when I need it					
I like to encourage others to do well					

CEDPA, 2008.

THANK YOU FOR COMPLETING THE QUESTIONNAIRE

APPENDIX E: INTERVENTION QUESTIONNAIRES

2. GLAMA & BLAST YEAR 7 Participant Questionnaire

Name_____ **Form**_____ **Date**_____/_____/20___

RMIT University
School of Medical Sciences
Discipline of Exercise Sciences
PO Box 71
Bundoora VIC 3083
www.rmit.edu.au

GLAMA & BLAST

PEER SUPPORT AND LEADERSHIP PROGRAM

YEAR 7

AHSE Questionnaire

INSTRUCTIONS

This questionnaire asks you about your thoughts, feelings and attitudes about yourself, friends and your school.

- There are NO right or wrong answers.
- We would like you to answer all the questions as accurately and honestly as you can.
- If you don't understand any of the questions or words, please ask for help.
- This is about you and what you think and this information is very important to us.
- Make sure you fill in your name, form and date on each page.

Thank you

Name_____ **Form**_____ **Date**_____/_____/20___

QUESTIONS ABOUT YOU

1. Are you:

☐ Male ☐ Female

THINKING ABOUT SCHOOL

When you answer the following questions;

YES! means you definitely agree with the statement
yes means you agree a bit
no means you disagree a bit
NO! means you definitely disagree

1.	I try hard at school	**YES!**	**yes**	**no**	**NO!**
2.	There are lots of chances for students at my school to get involved in sports, clubs and other activities outside class	**YES!**	**yes**	**no**	**NO!**
3.	Doing well in school is important to me	**YES!**	**yes**	**no**	**NO!**
4.	Teachers notice when students are doing a good job and let them know it	**YES!**	**yes**	**no**	**NO!**
5.	At my school, students have a lot of chances to help decide and plan things like school activities, events and policies	**YES!**	**yes**	**no**	**NO!**
6.	My teachers are fair in dealing with students	**YES!**	**yes**	**no**	**NO!**
7.	Continuing or completing my education is important to me	**YES!**	**yes**	**no**	**NO!**
8.	I feel very different from most other students here	**YES!**	**yes**	**no**	**NO!**
9.	I can really be myself at this school	**YES!**	**yes**	**no**	**NO!**
10.	Other students in this school take my opinions seriously	**YES!**	**yes**	**no**	**NO!**
11.	There's at least one teacher or other adult in this school I can talk to if I have a problem	**YES!**	**yes**	**no**	**NO!**
12.	Student activities at this school offer something for everyone	**YES!**	**yes**	**no**	**NO!**
13.	Students have a say in decisions affecting them at this school	**YES!**	**yes**	**no**	**NO!**
14.	Students at this school are encouraged to take part in activities, programs and special events	**YES!**	**yes**	**no**	**NO!**
15.	I am encouraged to express my own views in my classes	**YES!**	**yes**	**no**	**NO!**
16.	Most of the students in my class(es) enjoy being together	**YES!**	**yes**	**no**	**NO!**

Name_____ **Form**_____ **Date**_____/_____/20___

17.	Most of the students in my class(es) are kind and helpful	**YES!**	**yes**	**no**	**NO!**
18.	Most other students accept me as I am	**YES!**	**yes**	**no**	**NO!**
19.	I feel like I am successful in this school	**YES!**	**yes**	**no**	**NO!**
20.	I feel I belong at this school	**YES!**	**yes**	**no**	**NO!**
21.	I feel I can go to my teacher with the things that are on my mind	**YES!**	**yes**	**no**	**NO!**
22.	In this school, teachers believe all students can learn	**YES!**	**yes**	**no**	**NO!**
23.	In this school, student's ideas are listened to and valued	**YES!**	**yes**	**no**	**NO!**
24.	In this school, teachers and students really trust one another	**YES!**	**yes**	**no**	**NO!**
25.	In this school, teachers treat students with respect	**YES!**	**yes**	**no**	**NO!**
26.	This school really cares about students as individuals	**YES!**	**yes**	**no**	**NO!**
27.	Most of my teachers really listen to what I have to say	**YES!**	**yes**	**no**	**NO!**

THINKING ABOUT PEOPLE AT SCHOOL

1. Has anyone teased you or called you names recently?

☐ No

☐ Yes

If Yes, how often?

☐ Most days

☐ About once a week

☐ Less than once a week

Were you upset or angry when it happened?

☐ Not at all

☐ A bit

☐ A lot

2. Has anyone spread rumours about you recently?

☐ No

☐ Yes

If Yes, how often?

☐ Most days

☐ About once a week

☐ Less than once a week

Were you upset or angry when it happened?

☐ Not at all

☐ A bit

☐ A lot

3. Have you been deliberately left out of things recently?

☐ No

☐ Yes

If Yes, how often?

☐ Most days

☐ About once a week

☐ Less than once a week

Were you upset or angry when it happened?

☐ Not at all

☐ A bit

☐ A lot

4. Have you been threatened physically or actually hurt by another student recently?

☐ No

☐ Yes

If Yes, how often?

☐ Most days

☐ About once a week

☐ Less than once a week

Were you upset or angry when it happened?

☐ Not at all

☐ A bit

☐ A lot

THINKING ABOUT FRIENDS

1. Do you have a group of friends that stays in close touch?

☐ No ☐ Yes

2. Recently have you had any fights or arguments with people close to you?

☐ No
☐ Yes- with one or more people
☐ Yes- with more than two people

3. If you get angry or upset, do you have people you can tell just how you feel?

☐ No
☐ Yes- with one or two people
☐ Yes- with more than two people

4. When you feel happy, do you have someone you can share this with?

☐ No ☐ Yes

5. Do you have someone you can trust with your private thoughts and feelings?

☐ No ☐ Yes

Name_____ **Form**_____ **Date**_____/_____/20___

6. If you're having a tough time, do you have someone you can really depend on?

☐ No ☐ Yes ☐ Yes, but I don't need anyone

7. Is there anyone who really knows you very well (understands how you think and feel?)

☐ No ☐ Yes ☐ Yes, sort of

THINKING ABOUT YOURSELF

Please read each description of what your answer means.

Very bad at this means I would be so uncomfortable and unable to handle this situation that it would be avoided if possible.
Poor at this means I would feel uncomfortable and would have some difficulty handling this situation.
Good means I would feel comfortable and able to handle this situation well.
Very good at this means I would feel very comfortable and could handle this situation very well.

Then put a circle around the number that shows how well you think you do each of these things.

	How good are you at.....	**Very Bad**	**Poor**	**Good**	**Very Good**
1.	Inviting someone new to go with you to a social or sports event?	**1**	**2**	**3**	**4**
2.	Helping someone feel better when they are upset?	**1**	**2**	**3**	**4**
3.	Taking charge in a group?	**1**	**2**	**3**	**4**
4.	Sharing your personal thoughts or feelings with friends or family?	**1**	**2**	**3**	**4**
5.	Dealing with disagreements in ways that make things better instead of worse?	**1**	**2**	**3**	**4**
6.	Introducing yourself to someone for the first time?	**1**	**2**	**3**	**4**
7.	Showing another person that you understand their problems?	**1**	**2**	**3**	**4**
8.	Getting other people to listen to your opinions?	**1**	**2**	**3**	**4**
9.	Letting someone really get to know you?	**1**	**2**	**3**	**4**
10.	Controlling your temper when having a conflict with someone?	**1**	**2**	**3**	**4**
11.	Starting a conversation with someone you would like to get to know?	**1**	**2**	**3**	**4**
12.	Showing that you care when someone talks about their problems?	**1**	**2**	**3**	**4**
13.	Saying 'no' when someone asks you to do something that you don't really want to do?	**1**	**2**	**3**	**4**
14.	Letting friends know you like them by telling or showing them?	**1**	**2**	**3**	**4**
15.	Listening to the other person's point of view in an argument?	**1**	**2**	**3**	**4**